26 JUNE 1953

ONE SHILLING

FLIGHT

and

AIRCRAFT ENGINEER

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

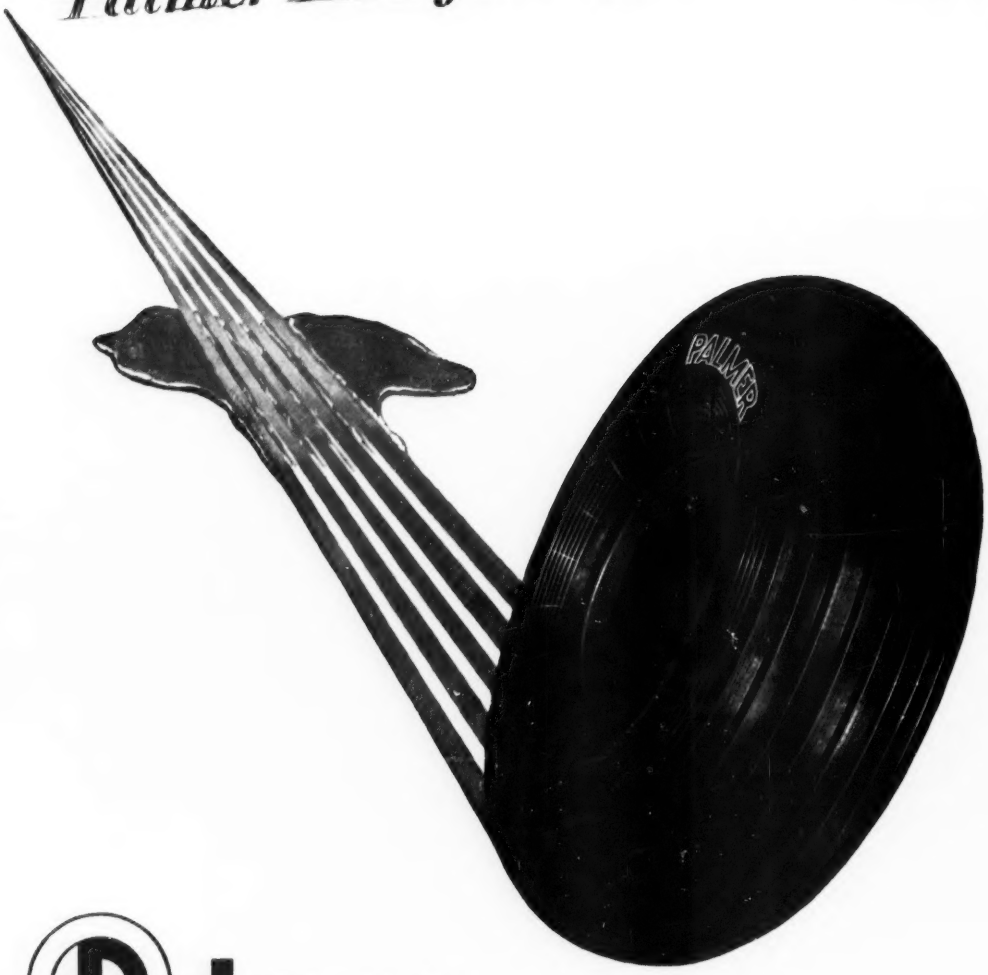
ROTOL

at Paris

Rotol Propellers and Aircraft Equipment are exhibited on the Rotol Stand 20e Salon International de L'Aeronautique Le Bourget Aerodrome

ROTOL LIMITED GLOUCESTER ENGLAND

Palmer Ribs for safer landings



Palmer

PALMER RIBBED TREAD AERO TYRES HAVE THESE ADVANTAGES OVER ORDINARY PATTERNED TYRES:

No heel-and-toe wear *Ribs don't fling mud*

Ribs wear longer—more rubber where it's wanted

Effective grip on wet runways—flexible ribs act as squeegees.

RIBS GIVE AS SAFE A WARNING OF WEAR AS PATTERN TREAD

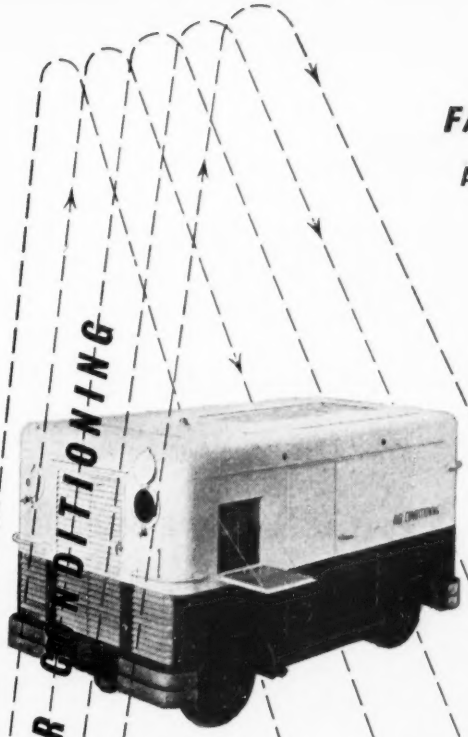
Service to Aircraft Constructors

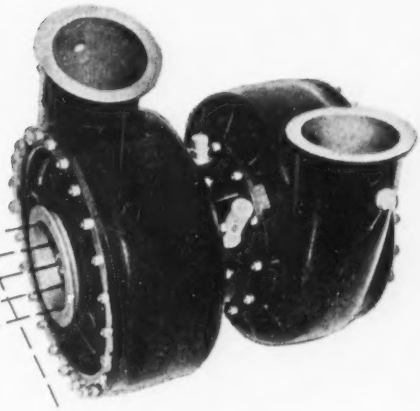
WHEELS • TYRES • BRAKES • PNEUMATIC RAMS
REDUCING VALVES • SILVOFLEX HOSE

THE PALMER TYRE LTD, PENFOLD ST, EDGWARE ROAD, LONDON, N.W.8

FAMOUS USERS OF GODFREY EQUIPMENT

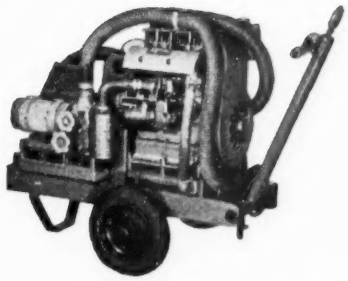
Aircraft fitted with Godfrey Cold Air Units include the Comet, Ambassador, Viscount and Britannia . . . the R 2000 Air Conditioning Trolley is used by B.O.A.C. and Q.A.N.T.A.S.; it has also been ordered by Air France and Aeromaritime de Transport . . . Pressure Testing Trolleys Mk.1C have been supplied in quantity to the R.A.F. Godfreys are specialists in the design and manufacture of air conditioning equipment for all types of civil and military aircraft.





COLD AIR UNITS

PRESSURE TESTING



20th Salon International de l'Aeronautique Stand No. 105

GODFREY

SIR GEORGE GODFREY & PARTNERS LTD

HANWORTH, MIDDLESEX
HENLEY, OXFORDSHIRE

OVERSEAS COMPANIES: MONTREAL JOHANNESBURG & MELBOURNE

A

123, Avenue GÉNÉRAL DE GAULLE
LA GARENNE-COLOMBES (Seine)

CHANDOS HOUSE
PALMER STREET, S.W.1
Telephone : ABBEY 3304 (3 lines)

vous invite à voir à son Stand no 126 du Salon de l'Aviation de PARIS-LE BOURGET (26 Juin—5 Juillet 1953)

invite you to see their exhibits at their Stand No. 126 of the Salon de l'Aviation PARIS-LE BOURGET (26th June—5th July 1953)

lädt Sie ein, seinen Stand Nr. 126 auf der Luftfahrt-Ausstellung in PARIS-LE BOURGET, vom 26 Juni bis 5 Juli 1953, zu besuchen

le invita a visitar en su Stand No 126 del Salon de la Aviacion, en PARIS-LE BOURGET (26 de Junio—5 de Julio 1953)

Vi invita a vedere al suo Stand No 126 del Salone del l'Aviazione a PARIGI-LE BOURGET (26 Giugno—5 Luglio)

Ses appareillages pour le ravitaillement des avions en combustible (groupes de pompage)

Aircraft refuelling equipment

Seine Brennstoff-Versorgungsanlagen für Flugzeuge (Pumpenaggregate)

Sus aparellajes para el suministro de combustibles a aviones (grupos de bombeo)

Le sue attrezzature per il rifornimento di combustibile agli aeroplani

Ses filtres micrométriques tous débits

Range of micro-filters of all sizes

Seine Hochleistungs-Filter feinster Filtration für alle Leistungen

Sus filtros micrometricos para todos caudales

I suoi filtri micrometrici di varia capacità di erogazione

Ses dispositifs limiteurs de remplissage des réservoirs

System of predetermined Aircraft Tanks Refuelling

Seine selbsttätig begrenzenden Tankfüllvorrichtungen

Sus dispositivos limitadores de llenado de depositos

I suoi dispositivi limitatori di riempimento per serbatoi

Ses indicateurs magnétiques divers

Magnetic indicators

Seine verschiedenen, magnetischen Anzeigevorrichtungen

Sus indicadores magneticos diversos

I suoi indicatori magnetici di livello per serbatoi

Ses raccords de tuyauteries à joint souple

Pipe connectors with flexible joint

Seine Rohrverbindungen und biegsamen Schläuche

Sus racores de tuberias de junta flexible

I suoi raccordi snodati per tubazioni

Ses vannes de délestage

Jettisoning valves

Seine Entlastungsschieber

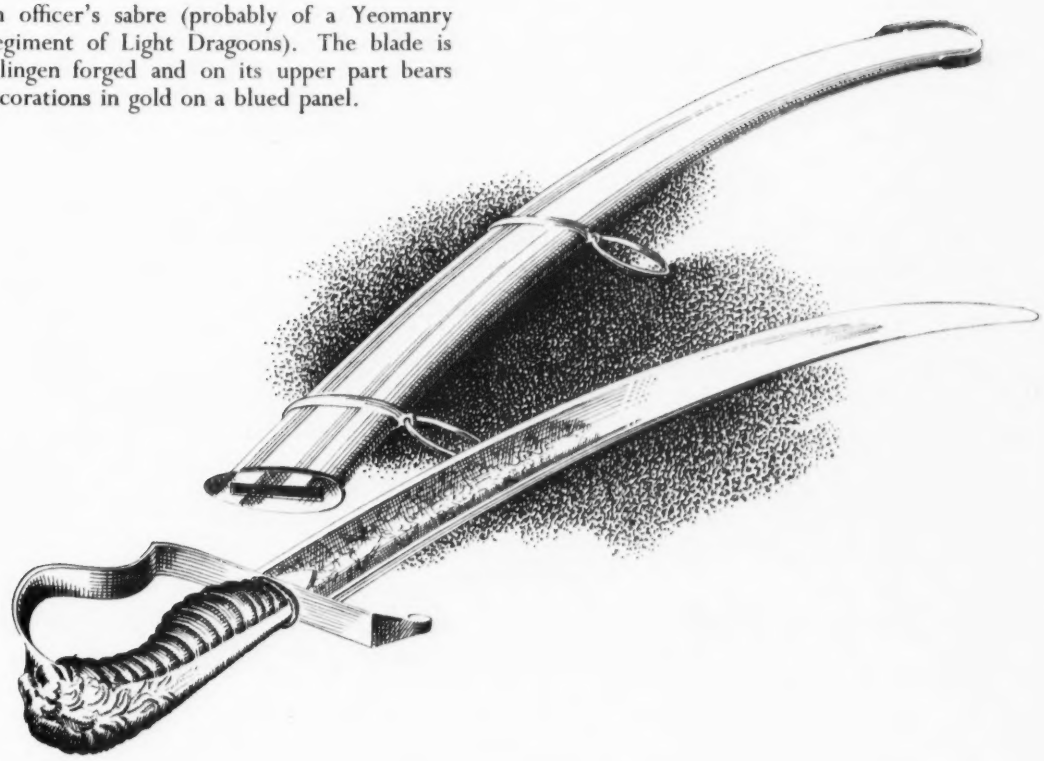
Sus valvulas de deslastrar

I suoi rubinetti deviatori per gruppi pompaggio carburanti

Ses accessoires divers — *Various accessories* — Seine verschiedenen Zubehörteile — *Sus accesorios diversos* — I suoi accessori diversi

No. 12 . . . EARLY 19th CENTURY

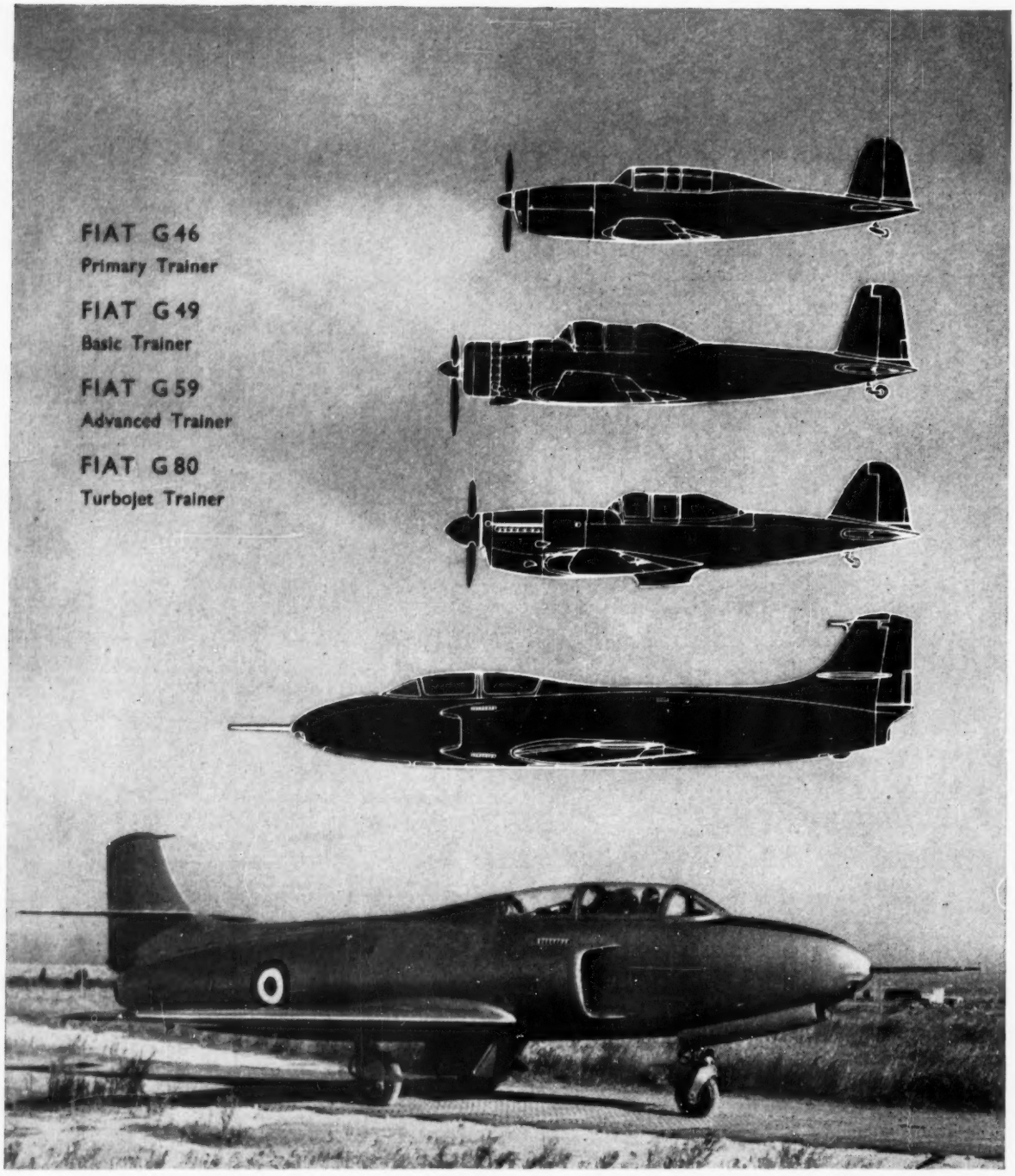
An officer's sabre (probably of a Yeomanry Regiment of Light Dragoons). The blade is Solingen forged and on its upper part bears decorations in gold on a blued panel.



FOLLANDS of HAMBLE

are forging the weapons of the future

FOLLAND AIRCRAFT LIMITED, HAMBLE, SOUTHAMPTON



FIAT

The four Fiat training planes that satisfy the latest requirements for the gradual and complete training of high-speed aircraft pilots.

AERITALIA SECTION (AEROPLANES) 336 CORSO FRANCIA
LINGOTTO SECTION (ENGINES) 250 VIA NIZZA

TURIN
(ITALY)

DECCA airfield RADAR

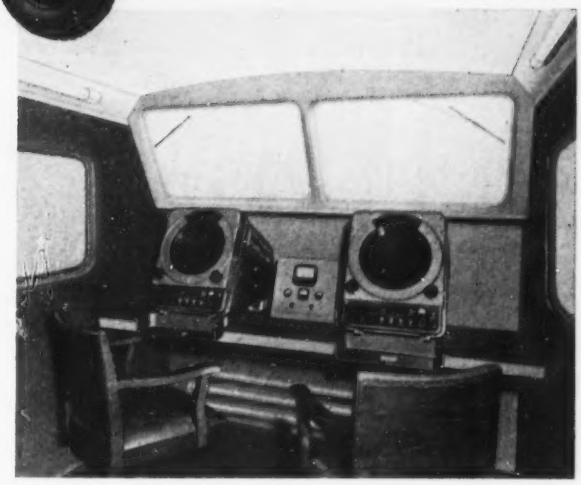
TYPE 424

*A NEW MEDIUM RANGE SURVEILLANCE RADAR AT A LOW COST

Type 424 is designed to provide a simple, compact and low-priced equipment capable of giving medium range surveillance for both military and civil airfields. This new Decca equipment has been developed to meet the requirements of air authorities throughout the world who require a surveillance of aircraft movements up to twenty miles from the airfield.

Many unique Decca Radar features are built into Type 424, including a new high-efficiency radar head and the Decca differentiation circuit for rain and snow suppression.

As these illustrations show, the equipment is particularly suitable for mobile use as its simple, compact design enables it to be rapidly installed in a wide range of vehicles.

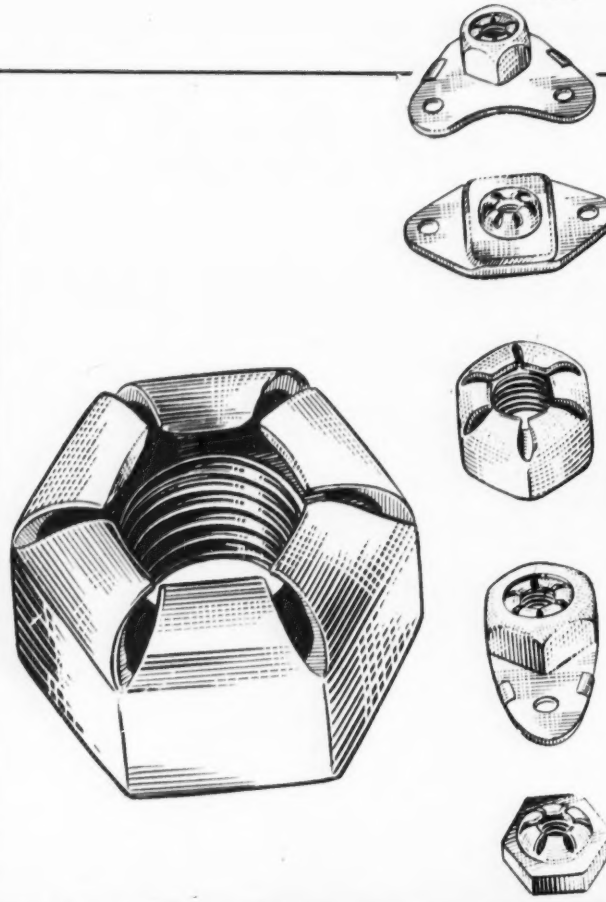


DECCA RADAR LTD · 1-3 BRIXTON RD · LONDON, S.W.9

Telephone : RELiance 8111 (30 lines)

Cables : Decradar, London

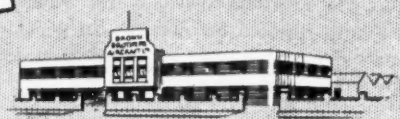
DR 228



Sole Manufacturers
of
ODDIE
STIFF
NUTS

Brown Brothers (AIRCRAFT) Ltd.

Also the
Largest Manufacturers
and Stockists of
A.G.S. B.S.S. S.B.A.C.
STANDARD PARTS



Aircraft and General Engineers
HOUGHTON ROAD · NORTHAMPTON

Telephones: Northampton 4940. *London: Clissold* 1280. *Telegrams: Imbrowned, Northampton.*

HOBSON GOLDEN JUBILEE

1903 H 1953

CORONATION YEAR

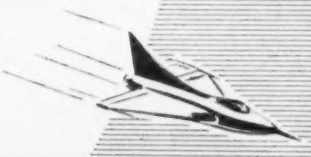
Since the inception of aviation a name proudly associated with every progressive step taken by the Industry

20E SALON INTERNATIONAL DE L'AERONAUTIQUE

LE BOURGET · PARIS

JUNE 26th TO JULY 5th

To our many friends who will be visiting Paris at this time, we extend a cordial invitation to visit our **STAND No. 31** where a full range of Hobson aircraft and engine accessories will be on display.



Hobson

Specialists in the design and manufacture of

INJECTORS · CARBURETTERS

POWER FLYING CONTROLS

GAS TURBINE ENGINE ACCESSORIES ETC

H. M. HOBSON LTD. · FORDHOUSES · WOLVERHAMPTON

Licensees in U.S.A. and Canada : Simmonds Aerocessories Inc. Tarrytown, New York

Licensees in Italy : Secondo Mona. Somma Lombardo, Italy

Agents in France : Societe Commerciale et Industrielle Franco-Britannique, 48 Avenue Raymond Poincaré, Paris 16E

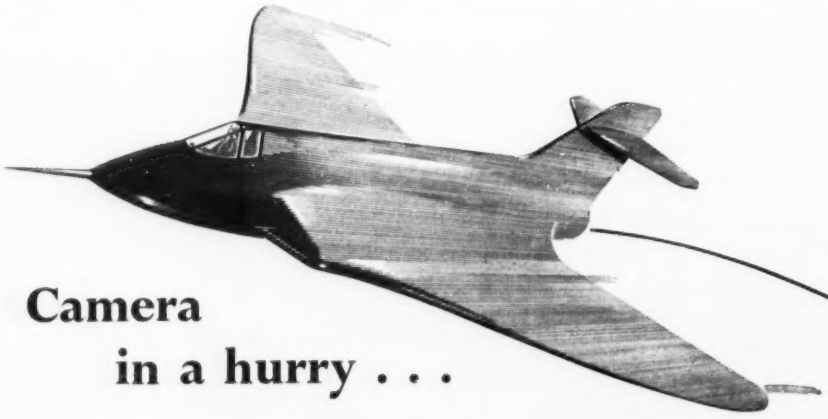
Teddington Controls Ltd. have pleasure in announcing that by courtesy of A.B.G. S.A., *3 Impasse Thoreton, Paris 15,*

a range of Teddington *equipment*

will be on view on Stand No. 71 at the Salon Internationale de l'Aeronautique at le Bourget from June 26th to July 5th, 1953.

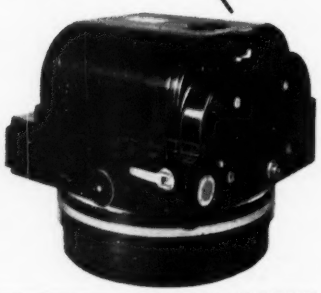
Teddington AUTOMATIC CONTROLS

TEDDINGTON CONTROLS LTD., MERTHYR TYDFIL, SOUTH WALES. Merthyr Tydfil 666.



Camera in a hurry . . .

Today's high speeds and altitudes demand new air cameras based on years of experienced construction. WILLIAMSON Cameras . . . up-to-the-minute in design and development . . . are manufactured with the skill and precision necessary for their new roles.



WILLIAMSON
MANUFACTURING COMPANY LIMITED

The Eagle IX Mark 2 Survey Camera in super priority production for the R.A.F. designated F.49 Mark 2.

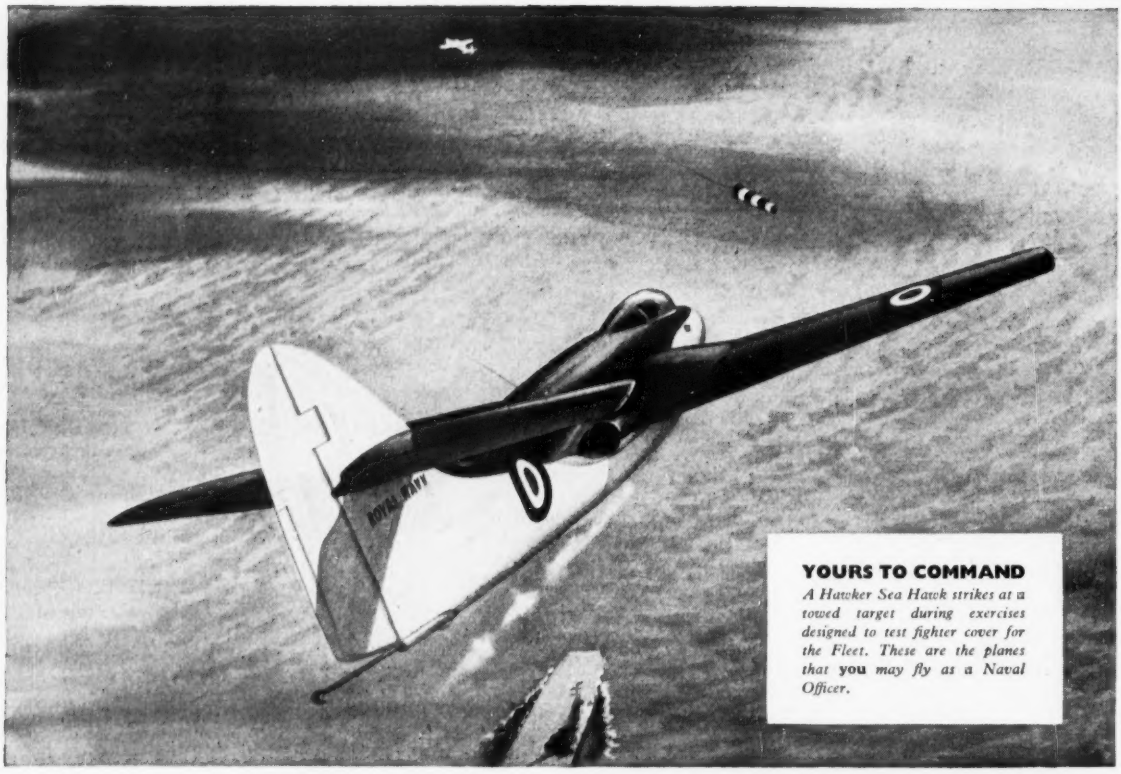
Photographic Engineers, LITCHFIELD GARDENS, WILLESDEN GREEN, N.W.10

IN CANADA: Williamson Company of Canada Limited, Toronto, Ontario

WM11

In squalls and
dirty weather . . . the pilots of West Norway Airlines
have good reason to trust their two Short Sealands.
Flying the Norwegian coast is a tricky business at all
times, yet through it all, the Sealands come with a
display of faultless performance and reliability, averaging,
between them, about ten hours flying daily.
W.N.A. write "The Sealands are the best aircraft we know
for handling in bad visibility flying; and passenger
confidence is borne out by the fact that every seat
is sold, a month in advance, on all routes."
Shorts
P29

SHORT BROTHERS & HARLAND LTD—THE FIRST MANUFACTURERS OF AIRCRAFT IN THE WORLD Queen's Island, Belfast, and at 17 Grosvenor St., London W.1



YOURS TO COMMAND
A Hawker Sea Hawk strikes at a towed target during exercises designed to test fighter cover for the Fleet. These are the planes that **you** *may fly as a Naval Officer.*

FLY in the FLEET AIR ARM

as a Short Service or National Service Officer

Officers who fly the Navy's planes enjoy a life of world-wide adventure. You can share this life.

You will do a vital, well-paid job. You will take command in the air (on reconnaissance, on anti-submarine patrol, on escort duty), yet share in the teamwork as an executive officer aboard ship. You will be called on to make important decisions—and act on them. You will carry your share of responsibility, for these decisions may affect the course of a whole fleet action.

There are two methods of entry :

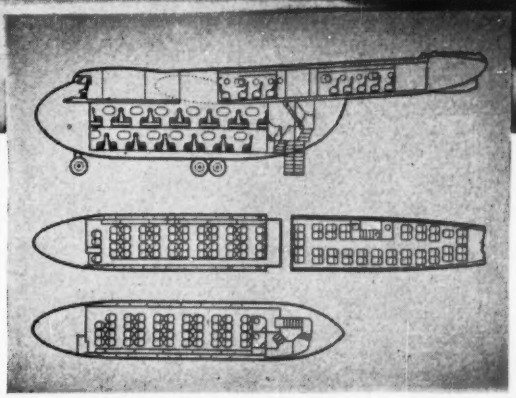
1. On a Short Service Commission. You serve for 8 years and at any time during this period you have a good chance of qualifying for a permanent commission. Or you can come out with a very useful gratuity of £1,500.

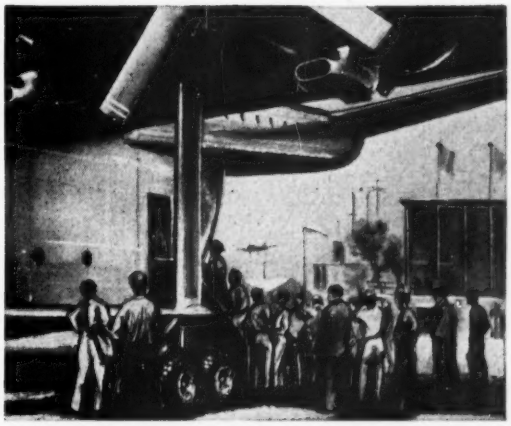
2. On a National Service Commission which you can if you wish extend to 4 years to qualify for a gratuity of about £500, or to 8 years with a good chance of qualifying for a permanent commission or coming out with an increased gratuity.

To Qualify : *You should be between 17 and 24 years old, fit, and hold a General Certificate of Education with a pass in English, Mathematics and one optional subject, School Certificate, or a Scottish Leaving Certificate.*

Write today. For full details of both methods of entry, write to:

Admiralty,
C.W. Branch,
(DT/71),
Queen Anne's Mansions,
London, S.W.1.





FOR *Bulk* TRANSPORT

The UNIVERSAL has been designed to meet the demand for an aircraft able to carry a variety of loads, being just as suitable for high-density passenger transport as for freight or freight-and-passenger operations.

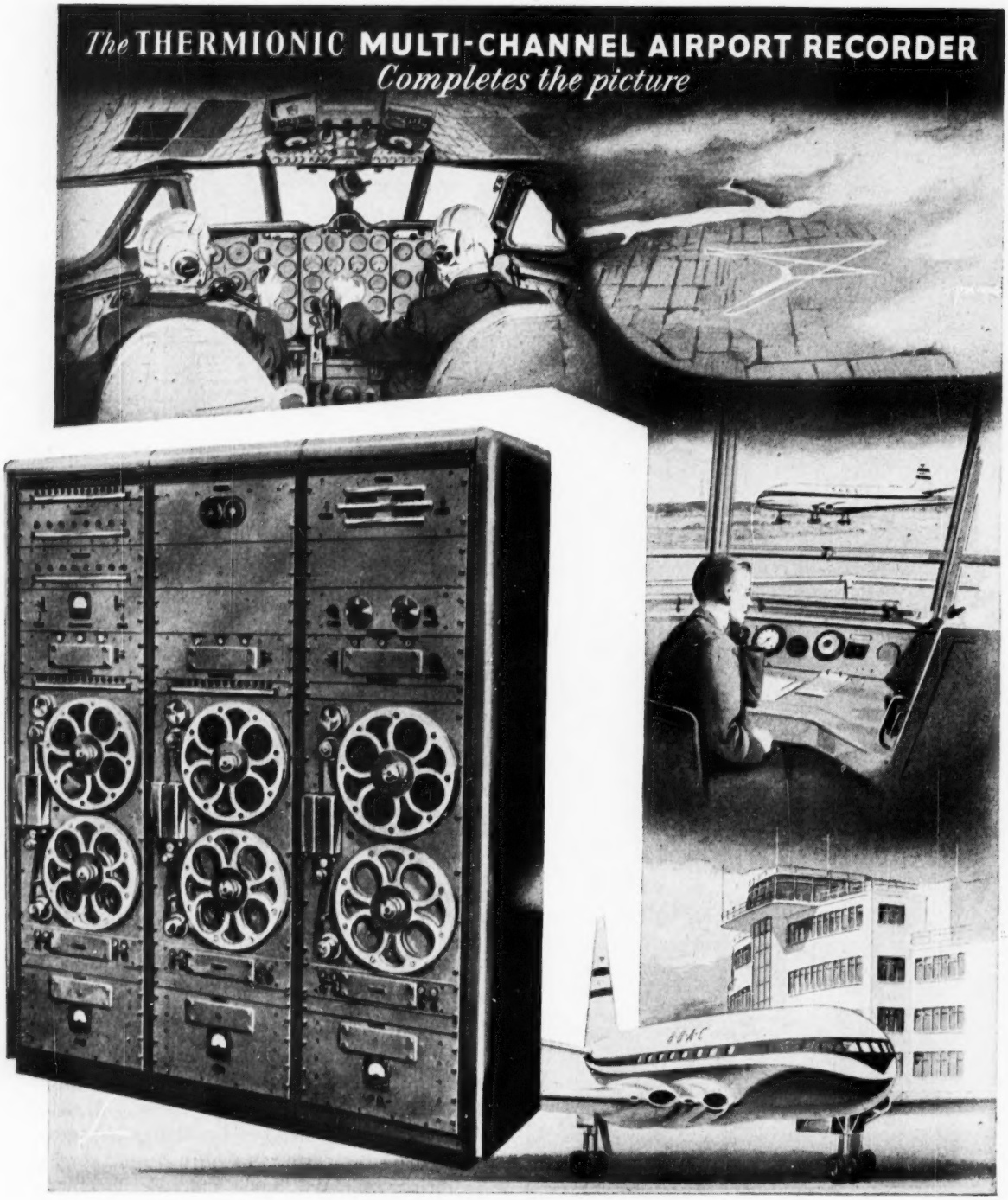
Complying fully with I.C.A.O. standards, the UNIVERSAL will safely land on or take-off from small airfields. As a high-density passenger transport its total seating capacity is 132. Ninety passengers are accommodated in a two-tier seating arrangement in the main compartment, with a further forty-two on the upper deck. Buffet and toilet facilities are incorporated.

Universal

Blackburn and General Aircraft Limited. Brough, E. Yorks

The THERMIONIC **MULTI-CHANNEL AIRPORT RECORDER**

Completes the picture



Mark II equipment now being supplied for civil and military use from Northern Europe to Australasia.

Further details and specifications on application to :—

THERMIONIC PRODUCTS LIMITED

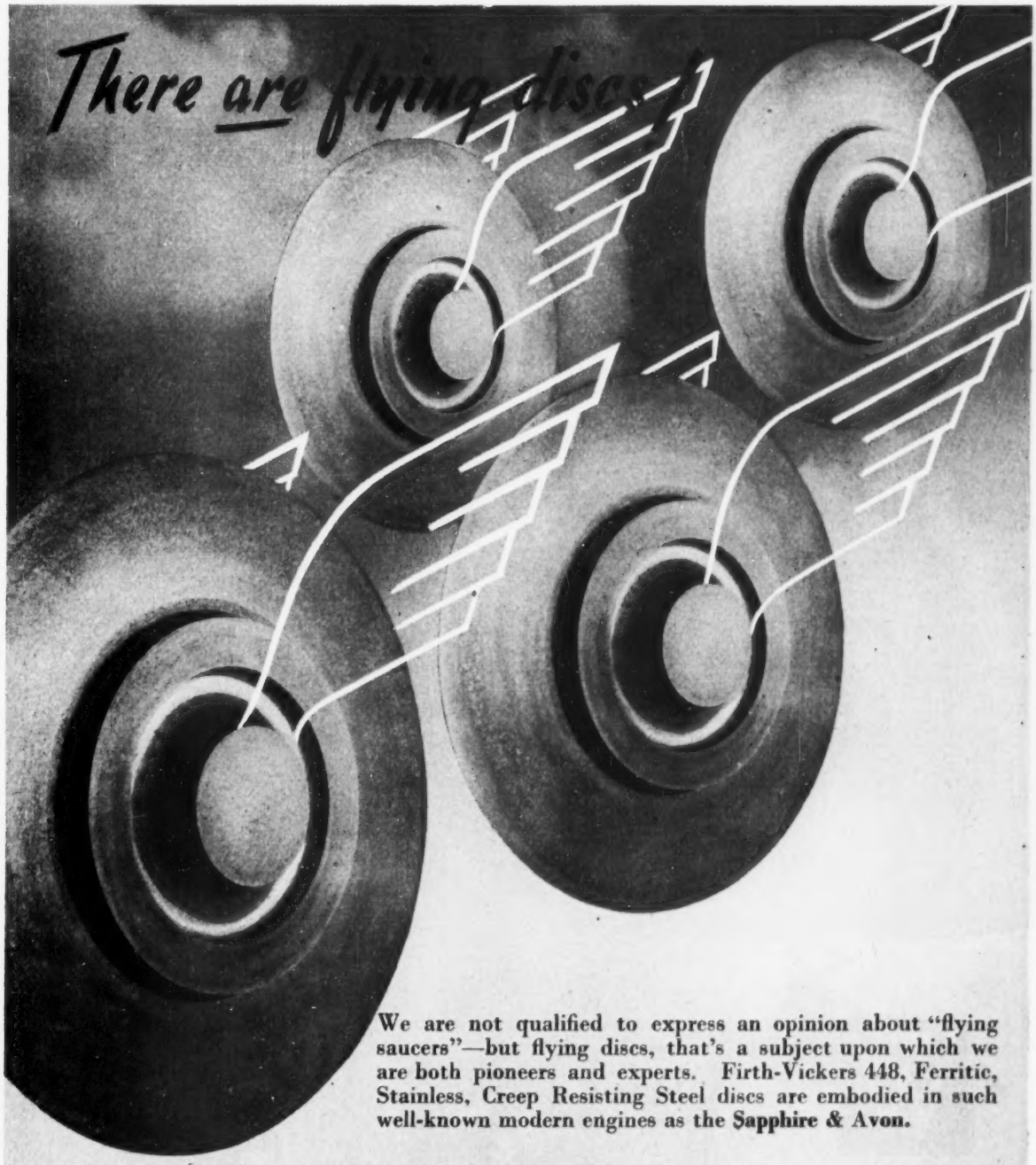
leaders in the field of magnetic recording

AND

BRUSH CRYSTAL COMPANY LIMITED

HYTHE • SOUTHAMPTON • ENGLAND

Telephone : Hythe (Southampton) 3265/9 *Cables :* Technico, Hythe, Southampton



We are not qualified to express an opinion about "flying saucers"—but flying discs, that's a subject upon which we are both pioneers and experts. Firth-Vickers 448, Ferritic, Stainless, Creep Resisting Steel discs are embodied in such well-known modern engines as the **Sapphire & Avon.**

FIRTH-VICKERS

448 STEEL

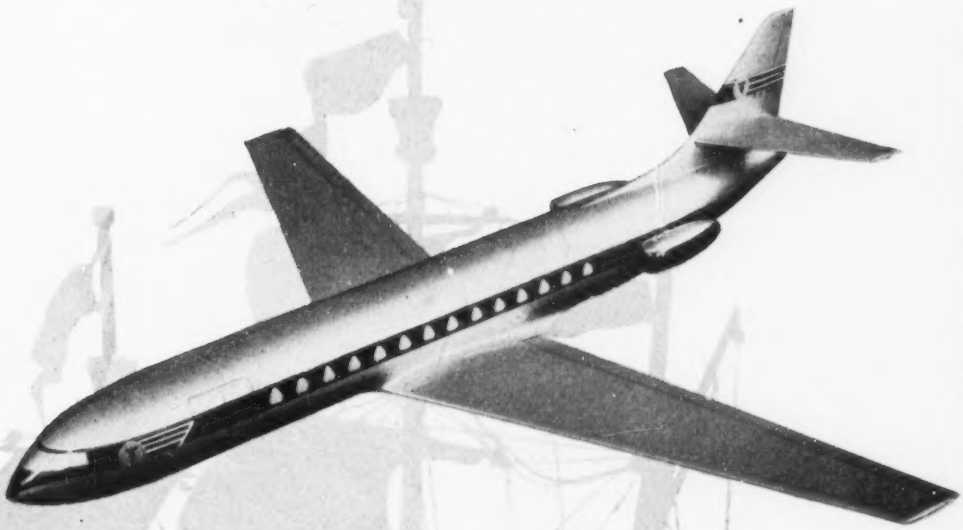
Ferritic · Stainless · Creep Resisting

FIRTH-VICKERS STAINLESS STEELS LTD., SHEFFIELD

Telephone: Sheffield 42051 Telegrams: STAYBRITE SHEFFIELD 9

ACCESSIBILITY
WESTLAND
S·55
HELICOPTERS
NOW FLYING OFF A FULL PRODUCTION LINE
WESTLAND AIRCRAFT LIMITED · YEOVIL · ENGLAND
CABLES: AIRCRAFT, YEOVIL

"CARAVELLE"



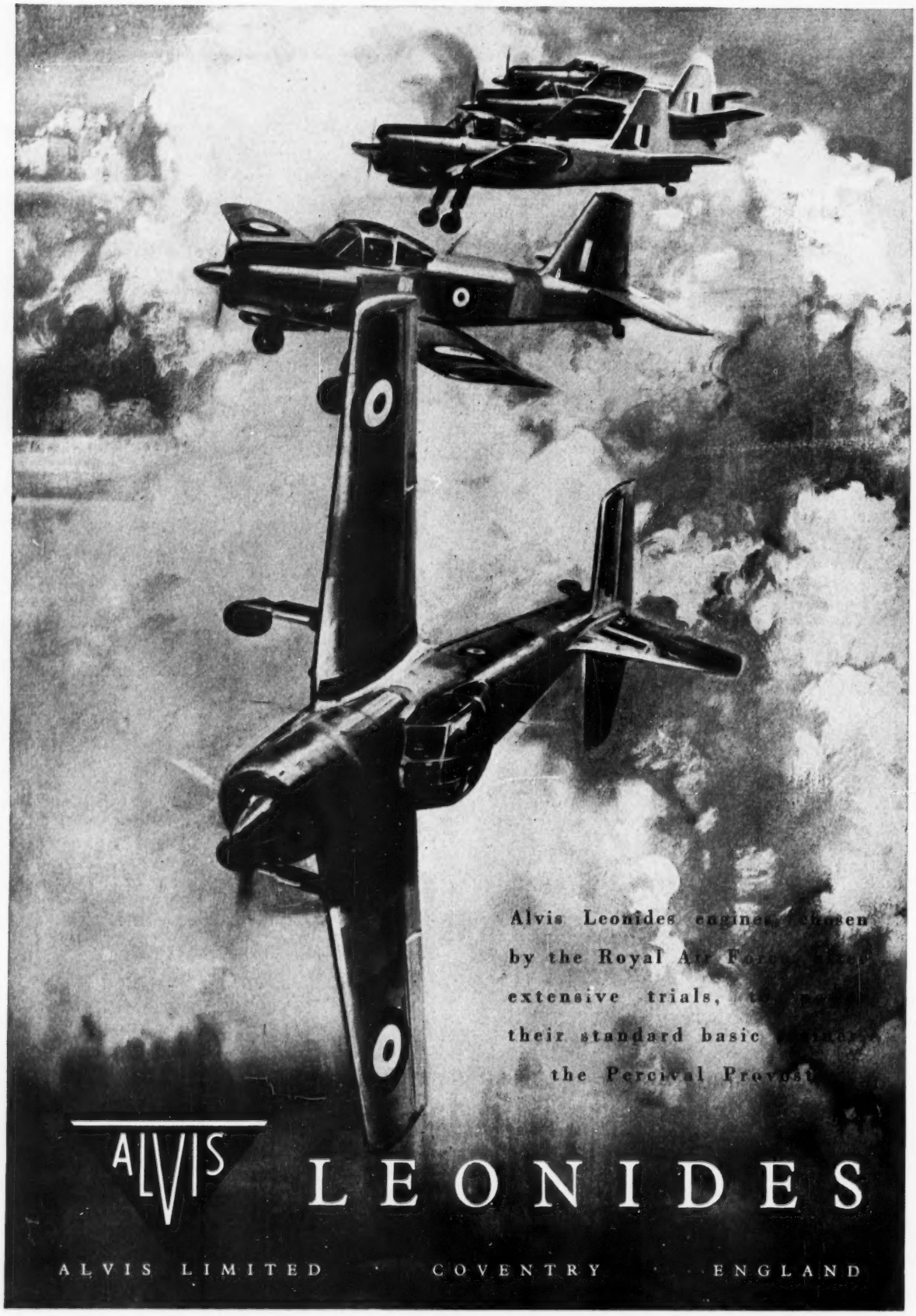
MEDIUM RANGE TWIN-JET AIRLINER

BRINGING TOGETHER
THE FULL RESOURCES AND EXPERIENCE
OF BOTH

SOCIÉTÉS NATIONALES
DE
CONSTRUCTIONS AÉRONAUTIQUES

SUD-EST
6, AVENUE MARCEAU - PARIS (8e)

AND SUD-OUEST
105, AV. RAYMOND-POINCARÉ - PARIS (16e)


Alvis Leonides engines
by the Royal Air
extensive trials,
their standard basic
the Percival Prevost
ALVIS
LEONIDES
ALVIS LIMITED · COVENTRY · ENGLAND

FLIGHT
and
AIRCRAFT ENGINEER

First Aeronautical Weekly in the World

Founded 1909

No. 2318 Vol. LXIII. FRIDAY, 26 JUNE 1953

EDITOR
MAURICE A. SMITH, D.F.C.

ASSISTANT EDITOR
H. F. KING, M.B.E.

ART EDITOR
JOHN YOXALL

Editorial, Advertising and Publishing Offices:

DORSET HOUSE,
STAMFORD STREET,
LONDON, S.E.1.

Telegrams, Flightpres, Sedist, London.
Telephone, Waterloo 3333 (60 lines.)

Branch Offices:

COVENTRY
8-10, Corporation Street.
Telegrams, Autocar, Coventry.
Telephone, Coventry 5210.

BIRMINGHAM, 2
King Edward House,
New Street.
Telegrams, Autopress, Birmingham.
Telephone, Midland 7191 (7 lines).

MANCHESTER, 3
260 Deansgate.
Telegrams, Iliffe, Manchester.
Telephone, Blackfriars 4412 (3 lines).
Deansgate 3595 (2 lines).

GLASGOW, C.2.
26b Renfield Street.
Telegrams, Iliffe, Glasgow.
Telephone, Central 1265 (2 lines).

SUBSCRIPTION RATES
Home and Overseas: Twelve months £3 3s. 0d. U.S.A. and Canada, $10.00.
BY AIR: To Canada and U.S.A., six months $16.

IN THIS ISSUE:

Rhodesia's Great Air Display - - - - - - 802
The National Air Races 804
Britain at Paris - - - 807
French Originality - - 811
The Sharp End (Part 2) - 817
AAFCE - - - - - 825

Worthy of the Occasion

ROYAL reviews of the fighting Services are rare and memorable occasions, and we have heard nothing but praise and superlatives in connection with the Naval Review at Spithead last week. There is little doubt that Her Majesty the Queen found two nights and a day spent with her Navy among the most pleasant of her seemingly innumerable and certainly exacting official duties. For the British public, too, the Isle of Wight area became a focal point, and hundreds of thousands found their way to the coast to see the mighty concourse of ships, the fly-past of aircraft and, later, the spectacular fireworks and illuminations.

The part played by the Fleet Air Arm did not, perhaps, receive fair recognition. Writers in one or two daily papers were scathing about the aircraft in the fly-past. But Her Majesty was reviewing Naval equipment in service today, whether it was new or old, and to decry on this occasion the efforts of the Fleet Air Arm on the score of the age of some of its aircraft was to miss entirely the point of the Review.

During the intervening week, *Flight*'s staff who were invited to take part in the Naval fly-past have compared notes, and here place on record their great admiration for the pilots and the organization of the Fleet Air Arm on that Royal occasion. Flying and time-keeping were exemplary. Men of less spirit and skill might have been dismayed by the great storm which came near to preventing the formations from linking-up. An impression of the weather through which these Naval airmen "pressed on" may be gained from the photograph on page 785 last week.

All fair-minded people will recall the Coronation Royal Review of the Fleet and Fleet Air Arm as a proud and splendid day.

And now we look forward to the Review of the Royal Air Force at Odiham next month. For some reason—unaccountable to us—the plans for July 15th seem to be on a comparatively modest scale. A mid-week day has been chosen; the airfield is rather inaccessible; a mere 25,000 of the public are to be catered for by ticket admission on one day. The R.A.F. are to be honoured with the Queen's presence for only an hour or two, at lunchtime and in the afternoon. Even the aircraft in the R.A.F. fly-past must give precedence in the air to civil machines wishing to fly in the area.

That the men and women of the Air Force will bring further credit to their great Service while under Royal surveillance—as they did, we may add, on Coronation day—we do not doubt; but we trust that they will also be given the scope to do themselves justice. The Air Force is the youngest Service, but it is not lacking in traditions and at this moment it is the most important to the country and, what is more, costs the most.

There are indications that the Review planning may be judged to have been carried out with insufficient imagination or appreciation of how the occasion will be regarded by the public. We trust that events will prove our fears on this score to be groundless.

Paris in View

ON nineteen occasions since 1909—perhaps the most portentous year in the history of flying—it has been *Flight's* pleasure to record the exhibits and happenings at the Paris Salon, and in our very first published issue we find an account of "the first real exhibition of practical flying that has ever been held anywhere." It seems almost unnecessary to add that the venue was the Grand Palais.

Now, after 44 years, the scene changes, and for the next few days we shall be taking not the well-remembered morning walk along the Champs-Élysées, but a north-easterly car-ride out of town towards Le Bourget, there to behold a most engaging assembly of aircraft. And in a fine new building we shall probe the power plants and accessories.

Britain's participation this year is not distinguished for its extent; but our prestige must benefit immeasurably from the late-hour decision to send over a Hawker Hunter for the two climactic displays. Nationally speaking, it will be teamed up with the Supermarine Swift, and these two pre-eminent intercepters will fly in concert with the Avro 707A, a Shackleton and a pair of Canberras. Other performers on the final days will be Canberras, Vampires, Sea Hawks and a Provost.

Technical excellence and flying skill should balance any disproportion in the "Salon."

FROM ALL QUARTERS

The Paris Salon

THE XXth International Aeronautical Salon is to be inaugurated by the President of the French Republic at 10 a.m. this morning. As most readers will already be aware, the venue this year is the famous airport of Le Bourget, where a new permanent building, with a floor area of nearly 100,000 sq ft and a frontage of 360ft, has been erected. Surrounding this in a huge park the aircraft will be gathered. A total of 156 French and foreign exhibitors is expected.

The Salon will be open to the public daily from 10.30 a.m. to 8.30 p.m., and a restaurant will provide meals *à la carte* and at fixed prices. Saturday, June 27th, will be devoted to light and sporting aircraft, and junior enthusiasts will be glad to know that half-price admission will be accorded anyone under 21 years of age. The following day will be concerned with commercial flying, and on this occasion various international airline companies will be prominently represented.

On July 4th, after an official luncheon, there will be a flying display of prototypes. On this occasion only civil and military technicians, military delegations and the Press will be admitted. Next day, however, there will be a great international air show, to which entrance will be unrestricted, and which will comprise the same programme plus demonstrations by NATO formations.

Following the "previews" of the Salon in this issue, *Flight* will present in the issue of July 3rd a detailed first-hand report on the principal exhibits to be followed a week later by a second report, in which technical aspects, the static exhibits and individual aircraft demonstrations will be described.

Inquest on Peter Lawrence

THE inquest on P. G. Lawrence, who lost his life in an accident near Bristol whilst flying one of the prototype Gloster Javelins, was opened at Flax Bourton, Somerset, on June 15th.

S/L W. A. Waterton (chief test pilot) said that Lawrence was in touch with Flying Control at Moreton Valence and reported that he was in trouble. In answer to the Coroner, witness said that there were only a few garbled words; there was nothing to indicate the type of trouble.

The inquest was adjourned until July 29th.

The funeral took place at Hessle, near Hull, on June 17th. Canon A. E. Smallwood, who conducted the service, said that Lawrence's death was an act of self-sacrifice. He could have saved himself by leaving the machine earlier; by remaining in it and guiding it over homes and playing-fields, he saved others.

A memorial serivce was held at Gloucester on June 20th.

Percival Pembroke C.1

ILLUSTRATED on this page is one of two aircraft of the above-named type now flying. These machines are not prototypes in the normal sense, being closely based on the Series 3 Prince and Sea Prince T.1. They are, in fact, the first of a sizable batch for the R.A.F.

The Pembroke C.1 has the fuselage of the Prince, but the floor is stressed for 15 g instead of 9 g. The eight seats, which previously faced forward, are now rearward-facing; the long nose—characteristic of the Sea Prince—is installed (but without the ditching bulkhead), and the wing span (56ft in the Prince) is now 64ft 6in. Other innovations are six built-in stretcher points, harness attachments for parachuting supplies and equipment, a fuel system adapted to take a 150-gal fuselage tank when required, and engines cleared for 1 lb additional continuous cruising boost. Intended rôles of the Pembroke are eight-passenger transport; casualty evacuation; freighting; supply-dropping; long-range ferrying (with fuselage tank); and possibly twin conversion training and experience, full dual equipment being fitted.

The all-up weight is about 13,000 lb, and the aircraft is cleared for flight without the loading doors, and with the centre "structural" door pillar removed. A civil development of this versatile transport is envisaged.

LONGER SPAN, clearly apparent in this photograph, secured last week from "Flight's" Gemini, is but one of the new features of the Percival Pembroke C.1. Other departures from former practice are noted below.

The Beverley Airborne

THE prototype Blackburn Beverley, forerunner of the Beverley C. Mk 1, ordered into quantity production for the R.A.F., took the air for the first time on June 14th. Occupying the pilot's and co-pilot's seats respectively were Mr. H. ("Timber") Wood, the company's chief test pilot, and Mr. Derek Brade, head of flight-test development. Airborne time was half an hour and the flight was "completely successful."

Powered by four Bristol Centaurus engines and spanning 162ft, the Beverley is the first British aircraft designed for the dropping of heavy military equipment, to which end the rear "clamshell" loading doors are removed. Field guns, tracked vehicles and light trucks can thus be dropped by parachute, together with their crews and necessary supplies. A typical service load will be ten jeeps in the main freight compartment, in addition to troops in the rear (upper) fuselage.

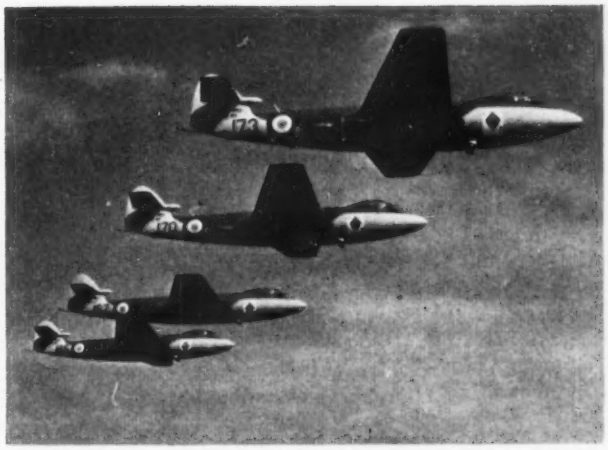
A.R.B. Luncheon

THE annual A.R.B. luncheon, which was once again a most excellent affair, took place at the Savoy Hotel, London, on Thursday, June 18th. Seldom can so many eminent men of aviation have been included round a table of 50 guests. Lord Brabazon, chairman of the A.R.B., proposing the toast of the Minister of Civil Aviation, opened his speech by remarking that aviation was essentially an international thing: thus Dr. Warner, president of I.C.A.O., was a most welcome guest. He then went on to compliment the Minister on the manner in which he had "added to his stature" so that he had become almost "a human skyscraper."

Lord Brabazon referred briefly to the activities of the Board during the year, and to his printed report (which is summarized on page 823); he then turned to the recognition of the work of Mr. R. E. Hardingham (chief executive and secretary to the Board) by the award in the Coronation Honours of the C.M.G. Guests made it apparent that they were in complete agreement with the chairman's remarks that no honour was more well-deserved. The Board could not do without the American C.A.A., and he thought that the converse was true. The two had riots and arguments, but ended as closer and closer friends. Lord Brabazon added that there was no fatigue among his staff. They were all sprightly, and there was no crack and no corrosion, but some extremely difficult decisions had had to be taken by seven most highly qualified men and they had never

SMALL ISLAND, BIG RECEPTION: This "Flight" photograph of Ronaldsway Airport shows well the new terminal building—already in use. It was due to be opened officially by the Lieut.-Governor of the I.o.M. last Wednesday, in the presence of Mr. Lennox-Boyd.

BULK TRAVEL: The prototype of the Blackburn Beverley (see news item herewith) during its first flight on June 14th. The unusual "dishpan" inner cowlings for the Bristol Centaurus engines are visible.



ACES ALL: Hawker Sea Hawks of No. 806 Squadron, Fleet Air Arm, led by the commanding officer, Lt. Cdr. Pat Chilton. An aerobatic team from this squadron will perform at Le Bourget on Saturday, July 4th.

shirked their duties. Moreover, A.R.B. members continued to fly without qualms in spite of all they knew about the aircraft!

In his reply, the Minister of Civil Aviation, Mr. Lennox-Boyd, remarked that he had been immensely impressed by Dr. Warner's handling of the opening meetings of I.C.A.O. at Brighton. He praised Lord Brabazon's work with the Board and associated himself with the earlier remarks regarding Mr. Hardingham's honour. The Minister looked forward to meetings of the A.R.B. and C.A.A. in the U.K. to look further into the problems of jet propulsion. In conclusion he remarked that the 18 members of the Board had cost £23 in the last year, and thus they should "carry not only the respect but the gratitude of the taxpayer."

"The Guests" were proposed by Major R. H. Thornton in a characteristic and highly amusing speech which defies reporting. In response, Sir William S. Farren in his capacity as president of the Royal Aeronautical Society, spoke of the love of flying for its own sake which was shared by engineers, technicians and scientists in aviation. He quoted a phrase used by the Queen in her Christmas broadcast, ". . . the strength to venture beyond the safeties of the past." Aviation would need such strength, but not entirely, it was hoped, in the field of arms.

To Fly for Follands

THE appointment of S/L. E. A. Tennant, D.F.C., as chief test pilot to the company has been announced by Folland Aircraft, Ltd. S/L. Tennant has considerable test-flying experience, his last appointment having been at the Aeroplane and Armament Experimental Establishment, Boscombe Down. Thirty-one years of age, he joined the R.A.F. in 1940 and served with Nos. 256 and 153 Squadrons on Defiants and Hurricanes. Later he transferred to Typhoons and flew about 450 hr on ground-attack operations. His D.F.C. was awarded in 1944 and by the end of the war he had completed some 250 operational sorties.

S/L. E. A. Tennant, D.F.C.

Notwithstanding his recent preoccupation, as a member of Boscombe's "B" Squadron, with heavy aircraft and trainers, it may be assumed that S/L. Tennant will ultimately be responsible for the flight-testing of the Gnat light fighter, an account of which appeared in *Flight* of April 3rd. The prototype is unlikely to fly for some months.

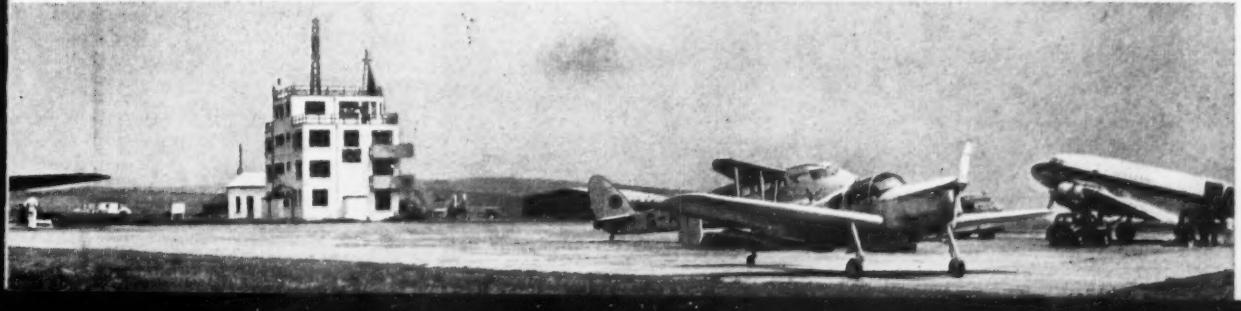
Reserve Schools Debated

MR. GEORGE WARD, Under-Secretary of Air, attempted to dispel doubts still remaining on the wisdom of closing certain Reserve flying schools when an adjournment debate on that subject was initiated in the House of Commons on June 17th by Mr. John Grimston (Con., St. Albans). Mr. Grimston took issue with the Ministry on the method of timing and putting over the original announcement and the effect of the move on the future supply of pilots for Coastal and Transport Commands and for civil aircraft. He observed that three months after the announcement was made an advertisement appeared in *Flight* asking Reservists to join the very Service from which they had been sacked. This was strongly worded and asked people who were in the R.A.F. in the war to go back into the R.Aux.A.F. and the Volunteer Reserve on a part-time basis. It went on, "What so many do not realize is that the R.A.F. really needs part-timers and cannot do without them. In going back on a part-time basis you will be doing a service to yourself and the country." The timing of that advertisement did not, in Mr. Grimston's submission, encourage the men concerned to feel that the decision was taken after a great deal of thought.

A further difficulty was that many of the men still did not know whether they were, in fact, to be offered flying jobs or not—though several obvious misfits had been retained—and, lastly, a feeling of disillusionment had arisen which might have an adverse effect on recruitment. Mr. Grimston did not believe that the supply of pilots was a thing of which the R.A.F. could wash its hands.

Mr. Ward, in reply, summarized the considerations which, as he had explained in a previous debate, led the Ministry to take a decision. He said that the intervention of the Christmas recess had made timing of the announcement a difficult matter. In regard to the *Flight* advertisement, he said that this was directed at the whole field of recruitment for non-Regular Forces and not necessarily at Volunteer Reserve aircrew alone. All the same, in the form in which it was produced it could be reasonably interpreted as designed to attract aircrew primarily and, for that reason had been withdrawn immediately after the Estimates debates in March. Mr. Ward went on to say that all pilots had already been told of their fate, and that all signallers and navigators would be told by the end of the week.

Mr. Ward made a sympathetic reference to No. 1 Reserve Flying School at Panshanger. This was the original de Havilland School of Flying and was the oldest of the schools which trained reservists of the R.A.F. for a great many years. "Many of the other civil flying schools," Mr. Ward continued, "have an equally fine record. . . . They have staffs which include names famous in the aviation world, and some who have been in the schools since their earliest days have helped to train many thousands of R.A.F. crews. The knowledge of the fine work done by these famous schools made our decision all the more difficult."



RHODESIA'S GREAT AIR DISPLAY

Centenary Rally at Salisbury's New Airport

THE Rhodes Centenary Air Rally, held at the new Kentucky Airport, seven-and-a-half miles from Salisbury, on June 13th and 14th, was probably the greatest air show ever staged south of the Equator. Military and civil aircraft converged on the airfield for days before the event, and outstanding support was given to the proceedings by R.A.F. machines from Germany and the United Kingdom. Some of the visiting aircraft, in particular a Canberra of 139 Squadron and a Lincoln of 83 Squadron, also gave short displays at a large number of towns other than Salisbury. Over 25,000 people watched the two-day display.

The rally was, clearly, an event of the first importance for Rhodesia, and it brought a message from the Prime Minister, Sir Godfrey Huggins, P.C., C.H., K.C.M.G., F.R.C.S., M.P., who was in London for the Coronation and the Commonwealth Conference. His words, which follow, were read by the Hon. Mr. G. A. Davenport, C.M.G., Minister for Mines and Transport and Acting Prime Minister in Sir Godfrey's absence. (It was Mrs. Davenport who later presented prizes and a trophy to every member of the R.A.F. and S.R.A.F. air crews.)

"This air rally and flying display, the most ambitious attempted in Southern Rhodesia, is designed as one of the major events in this year's Rhodes Centenary Celebrations. It would, I think, have appealed to Rhodes, with his keen sense of the importance of communications to the development of the African Continent. Nor would he have been insensible of the significance of the military contribution to this event.

"The rally is also the first big public occasion on which Salisbury's new airport has been brought into use. For some time it has been the headquarters of the Southern Rhodesia Air Force, but the terminal buildings and other amenities to permit its civil use have not yet been provided. Visitors to the rally will see for themselves, however, that Southern Rhodesia has here the essentials of one of the finest international airports in the world.

"This is entirely appropriate, for countries such as ours are bound to depend increasingly on air communications . . .

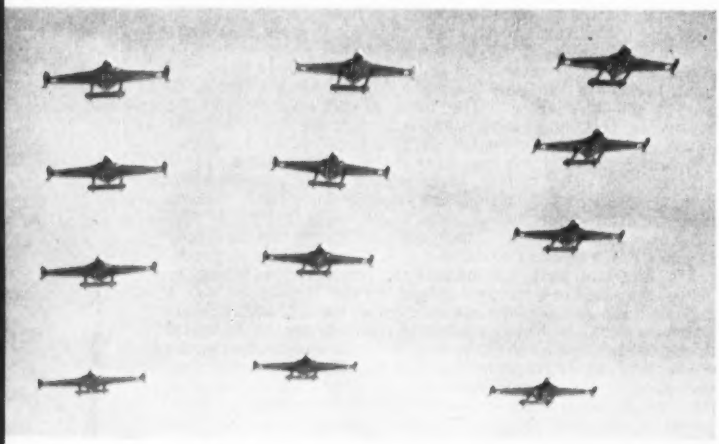
"The rally has only been made possible by the cordial co-operation of the Royal Air Force, the South African Air Force, the Southern Rhodesia Air Force, a number of airlines and many private owners. It has been organized by a committee operating under the authority and guidance of the National Rhodes Centenary Celebrations Committee. All profits will go to Air Force charities."

Many prominent people attended, amongst whom were: Brigadier H. C. Willmott, C.A.S. of the S.A.A.F.; A. Cdre. Bearne, A.O.C. of R.A.T.G.; A.V-M. Sir Leslie Brown; Sir Robert Tredgold, Chief Justice, Southern Rhodesia; Col. R. E. B. Long, Chief of Staff, Southern Rhodesia Forces and Mr. I. R. McLennan, U.K. High Commissioner, Southern Rhodesia.

On each of the two days, a two-and-a-half-hour Services flying display was held in the afternoon, whilst in the mornings there were heats and finals of closed-circuit and pylon races, and of aerobatic and "gliderbatic" competitions. The prize-giving was held on the Sunday evening.

Weather was practically perfect, with cloudless blue skies and a light easterly wind down the runway. It was, however, somewhat bumpy for formation flying, and the second Services display was marred by a fatal accident involving two R.A.F. Harvards from Thornhill.

The same programme was followed through for each of the two displays, beginning with formation aerobatics by Tiger Moths flown by pilots of the Southern Rhodesia Air Force, Capt. D. M. White and Lts. Graves and Smith, who carried out line-astern loops, aileron turns, barrel rolls and other manœuvres in impeccable formation. They were followed by nine Harvards of the Rhodesian Air Training Group, led by S/L. Hill, of R.A.F., Thornhill. The group of aircraft carried out various formation drills, culminating in a fly-past in the form



(Above) Southern Rhodesia Air Force Spitfires which took part in the Services display.

(Top, left) Venoms of 266 (Rhodesia) Squadron, R.A.F. whose display was much appreciated. They arrived there from Lusaka.

(Left) Aerial view of Kentucky Airport, showing part of main runways and the control tower and H.Q. building.

Photographs by courtesy of the "Rhodesia Herald."

(Right) The 12 Venoms of 266 Squadron lined up on arrival, with the Meteor N.F.11 of 219 Squadron in the foreground.

(Right, below) F/L. D. Smith and navigator, of 219 Squadron, pose beside their Meteor N.F.11.

(Below) S/L. T. Pearce (C.O. of 139 Squadron), with F/L. Greenhalgh and Chief Technician R. Claydon, in front of their Canberra.

of the letter "E"; and two other Harvards gave an exhibition of synchronized aerobatics whilst their fellows were re-forming in the distance.

A Spitfire flown by Capt. J. H. Deal, D.S.O., D.F.C., demonstrated the art of rocket-firing, and subsequently joined another Spitfire, flown by Lt. C. H. Paxton, for a remarkable aerobatic display which included some hesitation rolls at a notably low altitude. One of the most exciting moments of the afternoon followed, when a Meteor N.F.11 of 219 Squadron, M.E.A.F., flown by F/L. D. Smith, put on a fine display of fast and slow flying in front of the crowd, many of whom had not previously seen a jet aircraft perform.

Four South African Air Force Harvards were the next performers, flown by Lts. F. E. Potgeiter, D.F.C., R. E. Nienaber, E. N. Jones and A. N. Cook, all instructors from the C.F.S. at Nigel in the Transvaal. Lt. Potgeiter, the solo turn, gave an outstanding display in which flick rolls, spins and ultra-low-level hesitation rolls were a feature. The other three aircraft were linked together with streamers and contrived, in spite of the bumpy conditions, to put on a really spectacular show of formation aerobatics.

Next item on the agenda was a display by three S.A.A.F. Vampires of the O.T.U. at Langebaanweg, near Cape Town. The pilots were Capt. H. Odendaal and Lts. M. Frost and G. Patterson, all veterans of No. 1 Cheetah Squadron in Korea. Following the Vampires came eight Venoms of 266 Rhodesian Squadron of the R.A.F., led by their C.O., S/L. C. W. Couthard. The aircraft made a scrambled take-off and ten minutes later were at 42,000ft, where they themselves could be seen as well as their contrails. Returning to low altitude the Venoms demonstrated various formations before finishing a stream landing, the last aircraft touching down before the first had completed its landing run. Whilst the Venoms were climbing to height, a Bomber Command Canberra flown by S/L. T. Pearce put on a show that, not unnaturally, impressed the crowd to the utmost degree.

Later, F/L. Busham, one of 266 Squadron's flight commanders, gave a sensational display of aerobatics, which started with a half-loop and roll-off-the-top immediately after take-off and continued with Derry turns, inverted runs across the airfield and all the other tricks of the trade. His contribution was followed by a demonstration of ground attack by eight Harvards and six Spitfires of the S.R.A.F.: armoured cars and ack-ack units took part, and the "bombing" appeared to be very accurate.

Last item but one on the programme was a display by a Lincoln of No. 83 Squadron (F/L. Cauldwell) and a Hastings of Transport Command (F/L. Hall): both aircraft "buzzed" low over the field, and subsequently made runs with one and two engines feathered. Final event of the day was a superlatively contrived exhibition of formation flying by four Venoms of 266 Squadron, flown by S/L. Couthard, F/L. J. R. D. Taylor, F/L. P. Stowell, and P/O. P. R. E. McLennan.

A large number of aircraft were available for inspection in the aircraft park. These included not only the machines that were taking part in the flying, but also Valettas, Dakotas, a Consul, a Chipmunk, an Anson XIX, a Beechcraft Bonanza, a Beech D.17S, a Viking and a Beaver. To supplement the display flying, a roaring trade in "flips" was done by various aircraft of Central African Airways and of Fishair, Ltd.; and the Salisbury Gliding Club had four gliders on hand, two of which were towed into the air by Tiger Moths and gave aerobatic displays.

Finally, there was a first-rate static display in one of the hangars. It had been organized by the S.R.A.F., and included amongst the exhibits were a stripped Tiger Moth, Harvard, and Spitfire; some specimen airscrews; a variety of armament and pyrotechnic stores; a Stromberg injection carburetter; and a whole array of instruments and gauges, sectional and otherwise. The station photographic section exhibited a fine selection of pictures, and local travel agencies and the airlines ran stalls advertising their services.

Everyone was agreed that the work of the S.R.A.F. in planning and organizing the flying displays was exemplary. Schedules were maintained precisely, and the kindness and helpfulness to the public was a source of appreciative comment. The success of the arrangements is the more creditable for being the first time such a display programme has ever been undertaken by the S.R.A.F.

The gates of the Rhodes Centenary Exhibition proper, in Bulawayo, were opened to the public on May 29th, although it will not be until July 3rd that the Queen Mother, accompanied by Princess Margaret, will perform the official opening ceremony. Nineteen countries, including Britain and all countries in Africa south of the Sudan, are represented in this great exhibition which commemorates the centenary of the birth of Cecil John Rhodes.

Results of the races and other competitions were :—

Closed-circuit Handicap (three 36-mile laps).—1, H. C. Perrem (Autocrat), 103.5 m.p.h.; 2, Capt. Ray Griffin (Tiger Moth), 97 m.p.h.; 3, H. Knill (Autocrat), 102 m.p.h.

Tiger Moth Pylon Race.—1, Lt. C. Graves, S.R.A.F.; 2, Capt. D. M. White, S.R.A.F.; 3, T. Posselt, Enkeldoorn Flying Club.

Arrival Competition.—1, T. Posselt (Tiger Moth); 2, R. Stuart (Bonanza); 3, A. C. Proktsch (Piper Pacer).

Best-kept Private Aircraft.—A. C. Johnston, Salisbury.

Tiger Moth Aerobatics.—T. Posselt, Enkeldoorn Flying Club.

NATIONAL AIR RACES

Keen Racing at Southend-on-Sea

PERHAPS we should apologize for being so British as to open this account of the National Air Races with a reference to the weather, but in view of the experiences on King's Cup race days in recent years and the sort of June we have been having, a word of gratitude should be offered up for the sunny and exhilarating Saturday at Southend on June 20th.

Congratulations and thanks are due to the Mayor of Southend and the staff of the Corporation who, together with the Royal Aero Club, organized the whole flying programme so unobtrusively and so well. Thanks are also due to Lord Brabazon who gave the prizes.

The short-circuit "Nationals" were, on the whole, a success, and as a public spectacle there is no doubt that this sort of race is a great improvement on the other kind of cross-country "disappear and reappear" function. This is not to say that all air races should be as short (ten miles); the main thing is that they should not be tiringly protracted or uneconomically long for the competitors. Up to 30 miles, with perhaps two appearances near the field per lap, might be tried with equal success for some annual races.

A tragic accident in which J. P. Crowther (Proctor 3) lost his life cast a shadow over the afternoon's activities, but we do not feel that this had any connection with the course, or that short-circuit races of this kind bring danger. The collision, which occurred when the aircraft were approaching a turning-point, could have happened in the same way in any recent race we can recall.

Some regret was expressed at the restricted number of aircraft racing in the final for the King's Cup. Perhaps on future occasions it might be possible, as in some previous years, to qualify the aircraft making fastest time in eliminating races as well as the winners on handicap.

Public attendance at Southend was good, although the races and the flying programme deserved even better. Among the demonstrations of aircraft to which we shall refer briefly, the Canadian Sabres were outstanding.

For the races there was little new in aircraft or in pilots, but it was very nice to see one comparative stranger, Mr. D. R. Robertson, do so well in his trim Moth Minor. We have always felt that it was a pity that this likeable light machine could not have been further developed in coupé form. The success in this case must in part have been due to the good flying of an experienced pilot.

The Mew Gull made a brief appearance in the Kemsley race with Nat Somers at the controls, but once again it was handicapped out of the race. In view of its "surplus" standard Gipsy Six engine, one cannot help wondering whether the reputation of both pilot and aircraft did not add a rose tint to the handicapper's expectations of performance on the short race. Fred Dunkerley has now acquired the Mew, and knowing what he can do with a Gemini, it will be interesting to see whether the Mew's pre-war performance can be recaptured or even surpassed.

Flying demonstrations were of a very high standard indeed. The first exponent of individual aerobatics was F/L. D. D. James, in a Meteor 7 from C.F.S., who did some very smooth and well-judged conventional manœuvres and in contrast added a breath-taking outside loop. The arrival of four Canberra B. Mk 2s from 101 Squadron (S/L. Crampton, F/L. Wightman, F/L. Caillard and F/O. Scott) was most impressive. Low and in tight formation, they suddenly appeared from the west with a great "swoosh." In the course of as good a Canberra formation demonstration as we have seen, one aircraft also peeled off to illustrate slow-flying characteristics, effectively contrasting with the lively passes of the other three.

As we have already noted, the Sabres from 410 and 441 R.C.A.F. Squadrons were superb. To herald his approach, F/O. Gibson (410 Sqn.) produced two of the loudest sonic bangs that we have heard; later, the tightness of his turns around the field and the sharpness of his pull-outs astonished pilots among the spectators. His very rapid upward rolls and vertical figure-of-eight almost from deck level were also much appreciated. As we heard someone remark, he really wrapped his Sabre around the enclosures. The four other Sabres of 441 Squadron gave as graceful and effortless a formation display as could a *corps de ballet*. Their slow slow-rolls, the speed with which they were back for the next manœuvre, and finally their bombshell break-away and high-speed criss-cross were all outstanding examples of master-demonstration flying.

Contrast in speed and rôle was provided by a Naval Dragonfly from 705 Squadron with Lt. Cdr. Spedding at the controls, and a fine finale was put on by the Patrouille d'Etampes under Captain Kergvelen. So familiar is this talented team that to say that its performance was as excellent as usual is praise enough.

The Racing

Shortly before the first race, there were but two centres of activity among the entrant aircraft, parked near the starting line. Mechanics were changing plugs on the starboard engine of Dunkerley's shiny blue-and-silver Gemini, while a burst tyre was being replaced on the port undercarriage-leg of Jimmy Rush's black, gold-trimmed Falcon Six.

The windsock was horizontal as Philip Mayne gave the "one-minute" signal to the leading pilots. Wingtip-men strained back as the engine of Spencer-Smith's Tiger Moth revved up, and then the green flag rapped down, the tail was up, and No. 21 was accelerating away to commence the Grosvenor Challenge Cup race, first of the 1953 Nationals.

As Westbrook's Messenger left the ground, the leading aircraft came in from east on the third leg of the first lap. The Moth Major was now ahead of the Tiger Moth, and the Minor was overtaking the Tomtit. The remaining aircraft retained their starting positions.

Prizewinning aircraft: On the left, Pat Fillingham, accompanied as usual by his wife, brings the Chipmunk in low to win the King's Cup. (Right) Walter Bowles taxies his cream Messenger 2A in after winning the Norton-Griffiths Challenge Trophy race.

(Left) Pat Fillingham, with his wife Sonia, receives the King's Cup from Lord Brabazon. (Right) Winner of the Kemsley Trophy race was the Proctor (top left) flown by (top right) A. S. K. "Buster" Paine. (Bottom right) The Proctors of Prince Alexander and D. J. Bennett, here seen taking off in the King's Cup Race. (Bottom left) Grosvenor winner D. R. Robertson.

"FLIGHT" PHOTOGRAPHS

On the second lap, the Tiger and the Major stayed close, while the Minor succeeded in passing over the Tomtit. The other machines were fairly well strung out, and as the leading Major buzzed past to complete this lap and begin the final one, the last Messenger (Westbrook's) passed across the far side of the airfield, just half a lap behind. On the final lap, distances closed steadily. The Minor, indeed, had overtaken both the Tiger and the Major with half a lap remaining, and Browning's Messenger was now ahead of the Autocar.

Towards the finish, the Minor, still in the lead, commenced a shallow dive. Close on its heels came a tight group of three; crossing the boundary, Ogilvy was just ahead of the Tomtit and the Taylorcraft, but Gregory flashed past the two biplanes as all three passed the finishing line.

The Norton Griffiths Trophy Race was the second event. Freeman's was the first aircraft off, followed by Jemmett and then Bullen, who kept noticeably low after take-off.

As the Proctors banked round to begin their first lap, Freeman's Hawk, still leading, passed the airfield, heading west after half a circuit. Take-off positions had been retained, but Fillingham's Chipmunk was overtaking Chandler in the enclosed Hawk. It was on the second lap that the aircraft really closed up and the relative positions altered; first to cross the airfield and commence the final circuit was Jemmett's smart cream Hawk, followed by the cream Messenger and the Whitney Straight. Freeman's Hawk had dropped back to fourth place, and, behind the Leopard Moth, Fillingham had drawn away from Chandler. With half a lap remaining, Bowles' Messenger was level with Jemmett's machine, as they passed the far side of the airfield, but eyes were now on Fillingham, already past the Moth and the Whitney Straight.

Low behind the west-approach trees came the close-packed group of aircraft, boring in to the finish. Bowles had taken the lead from Jemmett, but coming up fast were the Chipmunk and the first two Proctors. Within 30 sec the whole field had passed—an obvious tribute to the handicapping skill. Bowles was first, Fillingham second, and the two Proctors of Prince Alexander and Bennett—separated by the same interval throughout the race—third and fourth respectively.

The Kemsley Trophy Race take-off called for especially exact timing and positioning of aircraft, with very close handicap times.

As Paine's Speed Six got away, 3 min 9 sec after Turner's Proctor (first aircraft), the first three Proctors were approaching the field again on their first westerly leg, and the black Falcon Six was passing over as the Mew Gull began to take-off, 4 min 30 sec after the leader.

As the Mew Gull turned on to its first leg, it had just about one lap to gain, for the leaders were crossing the airfield boundary after their first circuit. In the lead was "Buster" Paine's red Proctor, having passed those of Turner and Crowther. As the line of leading aircraft turned on to their second westerly leg, Ron Paine, catching up well, completed his first lap, with the Mew Gull half a lap behind. And then came the tragic accident. Crowther had caught up with Turner, but was flying below him. The two aircraft were very close, and shortly before passing the north-east turning point appeared to collide, Crowther's machine losing its tail and falling into a field to the east of the airfield. Turner cruised on above the race.

The race continued. Paine's red Proctor finished first, with Rush in the Falcon Six a close and low second. Dunkerley's Gemini had passed the Nighthawk and McIntosh's Proctor, but was itself beaten into third place by the Speed Six just before the finishing line. Turner's Proctor, landing after the other aircraft, was seen to have a damaged starboard wheel-spat, a damaged leading edge and underside of the starboard wing, and bent-forward tips to the airscrew.

In the King's Cup Race, a non-starter was David Ogilvy in the Moth Major, with engine oil-pressure trouble. First off, therefore, was Duke in the Tomtit, followed by Robertson in the Moth Minor and Gregory in the Taylorcraft.

The aircraft were well scattered around the circuit, and it was not until the last laps that the true race-positions could be easily appreciated. Ron Paine's Speed Six was wasting no time, passing for the first time aircraft he would again have to lap in order to win. At the end of the leading aircraft's first two circuits, a mixed-up stream passed over the airfield heading east. Proctors 88 and 76 (Prince Alexander and Bennett), still tied by the same length of invisible string, led the Tomtit and the Speed Six, which had just passed the Moth Minor. Behind came "Buster" Paine's red Proctor and the Taylorcraft flown by Gregory.

After four laps, the Moth Minor was leading, having passed the Tomtit, and third was the Taylorcraft. Round again and into the final lap, the Moth Minor was still in front, and Gregory's Taylorcraft right on the tail of the Tomtit. Bowles' Messenger, the Chipmunk, and then a space before those two companions, 88 and 76, followed by Rush in the black Falcon Six, "Buster" Paine's Proctor, Dunkerley, and finally, after a further space, the Speed Six. As Ron Paine passed overhead, the Moth Minor crossed the far side of the field, just half a lap ahead.

The final turn was taken low by all the aircraft, and they stayed low right up to the finishing line. In a group together they approached, and within the airfield boundary Fillingham swept past the Minor to win the cup. Bowles managed to beat Robertson, also, into second place, and fourth was Jimmy Rush in the Falcon Six. After a short interval came Dunkerley and Ron Paine, ahead of the two Proctors.

NATIONAL AIR RACES RESULTS

Pl.	Pilot, Aircraft and Engine	H'cap Time m. s.	Average Speed (m.p.h.)	King's Cup Pl.	King's Cup H'cap Time m. s.	King's Cup Average Speed (m.p.h.)
Grosvenor Challenge Cup						
1	D. R. Robertson (Moth Minor, Gipsy Minor)	01 23	111	3	03 01	114.5
2	C. Gregory (Taylorcraft Plus D, Cirrus Minor 1)	01 45	112	9	03 27	114.5
3	D. F. Ogilvy (Moth Major, Gipsy Major 1)	00 06	101	—	00 00	non-starter
4	S/L. N. F. Duke (Tomtit, Mongoose 3C)	01 04	107	11	01 54	108.5
5	N. M. Browning (Messenger 4A, Gipsy Major 1D)	02 58	120			
6	Capt. D. M. Spencer-Smith (Tiger Moth, Gipsy Major 1)	00 00	100.5			
7	J. R. Batt (Autocar, Gipsy Major 1)	02 47	116.5			
8	E. W. Westbrook (Messenger 4A, Gipsy Major 1D)	03 26	113.5			
Norton-Griffiths Challenge Trophy						
1	W. P. Bowles (Messenger 2A, Cirrus Major 3)	01 23	129.5	2	07 18	133
2	W. P. I. Fillingham (Chipmunk 1, Gipsy Major 10C)	02 08	136	1	08 40	140
3	H.R.H. Prince Alexander of Jugoslavia (Proctor 5, Gipsy Queen 2)	02 37	147	7	09 45	144
4	D. J. Bennett (Proctor 5, Gipsy Queen 2)	02 40	141.5	8	09 50	144
5	D. C. Jemmett (Hawk Tr. 3, Gipsy Major 1C)	00 38	122			
6	F/O. M. R. T. Chandler (Hawk Tr. 3, Gipsy Major 1)	01 58	133.5			
7	G. R. I. Parker (Proctor 5, Gipsy Queen 2)	02 45	141			
8	G. F. Bullen (Miles Whitney Straight, Gipsy Major 1)	00 49	122.5			
9	A. J. Spiller (Leopard Moth, Gipsy Major 10-2)	01 30	128			
10	Miss F. M. Leaf (Hawk Major, Gipsy Major 1)	01 43	128			
11	K. M. Freeman (Hawk Tr. 3, Gipsy Major 1)	00 00	114			
12	C. W. W. Turner (Messenger 2A, Cirrus Major 3)	01 37	126			
Kemsley Challenge Trophy						
1	A. S. K. Paine (Proctor 1, Gipsy Queen 2)	00 41	149	10	11 02	150
2	S/L. J. Rush (Falcon Six, Gipsy Six 1)	01 47	163	4	12 55	166.5
3	R. R. Paine (Hawk Speed Six, Gipsy Six 1F)	03 09	183.5	6	15 26	187
4	F. Dunkerley (Gemini 1A, 2 Cirrus Minor 2)	01 57	163.5	5	13 07	167
5	F. Murphy (Hart, Kestrel 16)	02 00	163.5			
6	W/C. R. H. McIntosh (Proctor 1, Gipsy Queen 2)	01 05	151			
7	G. Marler (Falcon Six, Gipsy Six 1)	02 03	162.5			
8	G/C. C. M. M. Grece (Nighthawk, Gipsy Six 2)	01 21	151.5			
9	J. N. Somers (Mew Gull 2, Gipsy Six 2)	04 30	202.5			
10	H. J. G. Turner (Proctor 3, Gipsy Queen 2)	00 00	124			

HERE AND THERE

A 504 for South Kensington

AN Avro 504, which has been in a bomb-damaged museum in Hull, is to be transferred to the aeronautical collection at the Science Museum, South Kensington.

Globemaster Accident

A TAKE-OFF crash near Tokyo on June 18th, involving a U.S.A.F. C-124 Globemaster carrying troops back to Korea after leave, earned the melancholy distinction of being the worst accident in aviation history; 122 passengers and the crew of seven lost their lives. Suggestions are now being made in America that all C-124s should be grounded pending full investigation; it is pointed out that 330 men have been killed in five Globemaster accidents in a little over two years.

René Fonck Dies

THE great French ace of the First World War, René Fonck, died in Paris last week at the age of 59. He was credited with shooting down no fewer than 75 enemy aircraft; six of them fell to his guns during two patrols flown on the same day. In 1926 he attempted a flight from New York to Paris, but the aircraft—a three-engined Sikorsky S-35—crashed on take-off and Fonck's two companions lost their lives.

Come to Light

IT is now learned that the trouble which prevented Capt. Hackett, of Silver City Airways, from reaching Canada first with a batch of Coronation films was not in the fuel booster-pump for the ferry-tank of his Canberra. In actual fact, a wire had become disconnected in the pump-actuator circuit, and thus it was impossible to set the pump in operation.

A. A. BAILIE, of A.V. Roe, Canada, Ltd., has assumed the former duties of R. D. Armstrong, director of finance and administration. Mr. Bailie retains his title of comptroller: Mr. Armstrong has gone to Canadian National Railways.

CLINCHING THE DEAL: Fiat's Professor Vittorio Valetta (left) "puts it there" with North American's J. H. ("Dutch") Kindelberger while General Umberto Tolino beams. The three parties had lately negotiated the signing of a licensing agreement for the Italian manufacture of the F-86D, a specimen of which forms the background to this amiable scene at the North American plant.

Spreading Safety

A NEW quarterly has been added to the ranks of the various official and semi-official periodicals concerned with safety in aviation. Entitled *Air Safety Digest*, the new publication is produced by the Cornell Guggenheim Aviation Safety Centre, of 2 East 64th Street, New York 21, U.S.A.

"He's been saluting like that ever since he flew the Gannet"

Tributaries

"THE name 'Avon' no longer indicates a particular engine, but now represents a family of engines. There are various marks . . . in service. . . . Both the Bristol Aeroplane Co., Ltd., and the Standard Motor Co., Ltd., have now delivered Avon engines to the Ministry of Supply. It is particularly satisfying to us that engines produced by these companies are of the highest quality, and have carried out the strenuous Government type-tests without difficulty." —Lord Hives, Rolls-Royce chairman, in his statement circulated in advance of the annual general meeting to be held on July 14th.

On Call

AN S-55 helicopter of the U.S.A.F. 66th Air Rescue Squadron at Manston, Kent, will have stand-by crews from dawn to dusk throughout the summer, ready to respond to distress calls of all kinds, Service and civilian. "If a child floats away on a rubber raft and we can get there quicker than a boat," said the squadron's operations officer, "we will send the helicopter."

Pig-lift

IN 1909 Lord Brabazon of Tara "proved" that pigs could fly, by taking one as a passenger. Now, 44 years later, Eagle Aviation announce that they have secured a charter to carry 123 from this country to Jugoslavia. The animals will travel by DC-3, in six consignments.

Filton Festivities

TOMORROW, June 27th, will be a busy day at Filton. In the morning, Sir Walter Monckton, Minister of Labour and National Service, will lay the foundation-stone of the Bristol Aeroplane Company's new apprentice-training school. In the afternoon the apprentice prize-giving and the company's annual sports will be held.

Airliners *v* Ships

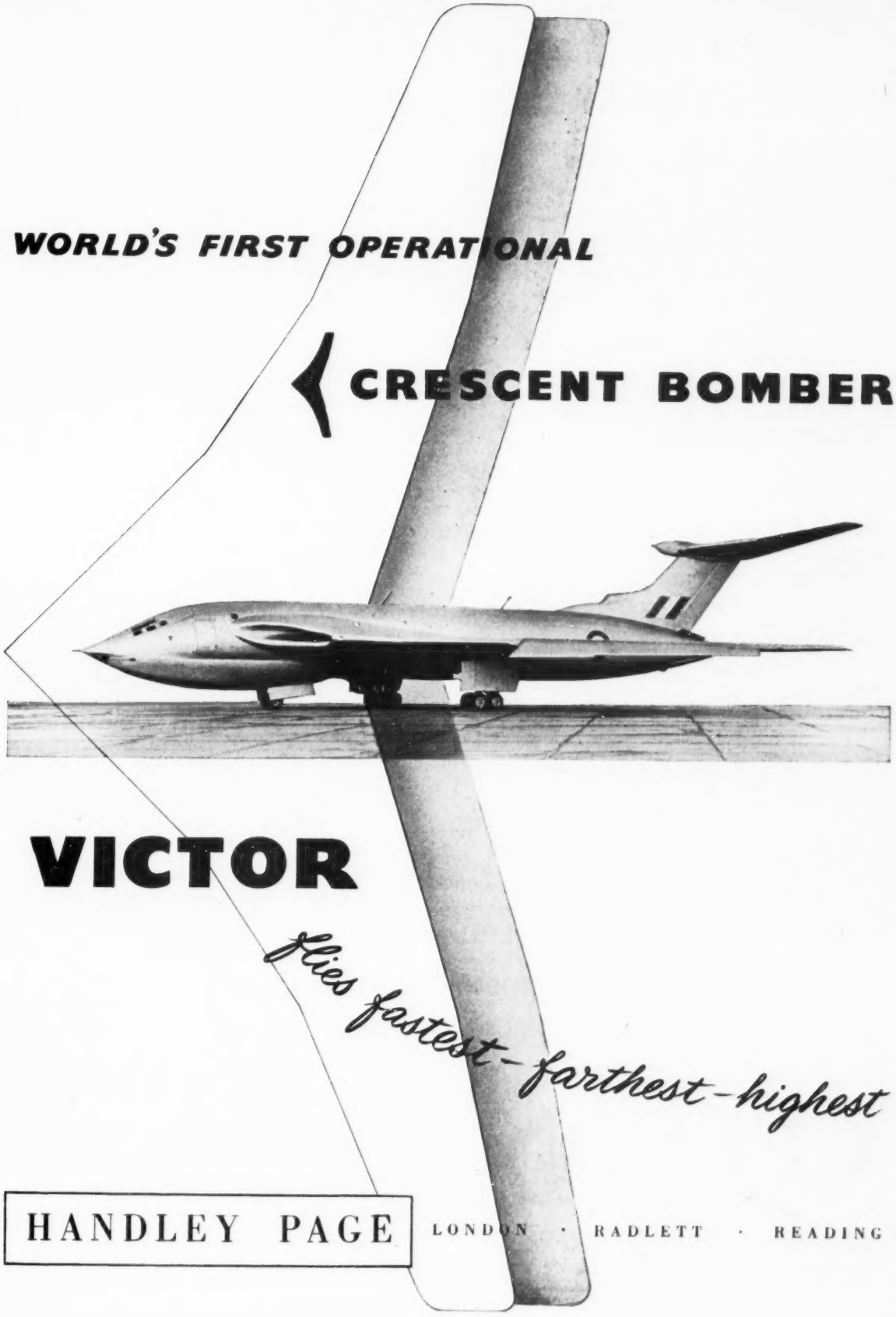
THE effectiveness of airline competition was recently admitted by a shipping executive, Capt. Anthony Cayzer, a director of Clan Line Steamers, Ltd. According to the *Financial Times*, Capt. Cayzer expressed the view that the days of large passenger ships were numbered, adding: "I am also sorry to say I think that in the not-too-far-distant future aircraft will begin to take high-grade cargo from ships." The speaker visualized ships of the future as having wave-skimming hydroplane-type hulls powered with gas turbines.

"No Droop" Rotors

ALL the U.S. and foreign patents of the Landgraf Helicopter Company, of Los Angeles, have been acquired by the Rotor-Craft Corporation, of Glendale, California. The patents apply principally to the design of the Landgraf "rigid-blade" rotor which, it is claimed, will appeal to commercial-helicopter operators by reason of the absence of blade-droop, thus facilitating safe entry or exit of passengers whilst the rotor is in motion. The Rotor-Craft Corporation was founded in 1944, and up till now has operated as a research and development organization.

WORLD'S FIRST OPERATIONAL

CRESCENT BOMBER



VICTOR

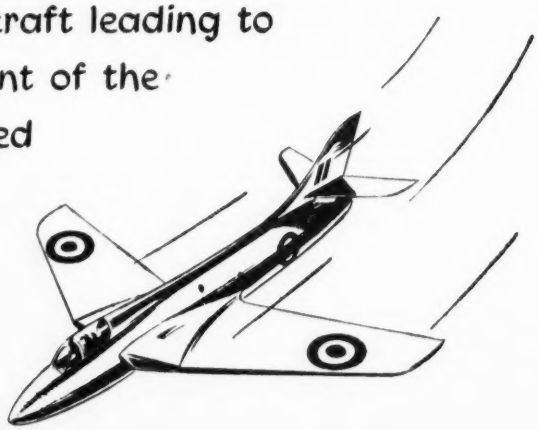
flies fastest - farthest - highest

HANDLEY PAGE LONDON · RADLETT · READING

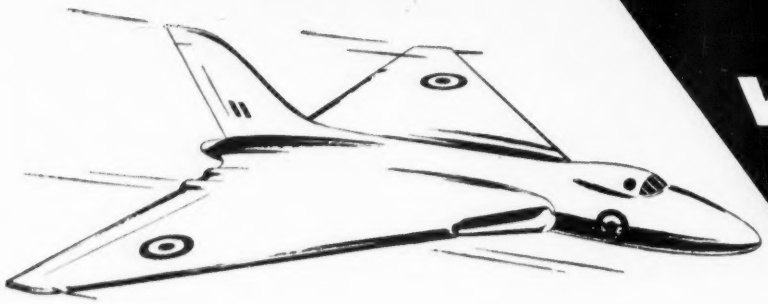
CELLON

HIGH SPEED FINISHES

have been used on all prototype aircraft leading to the development of the world acclaimed



HAWKER **HUNTER** FIGHTER



AVRO **VULCAN** BOMBER

now in super priority production for the Royal Air Force.

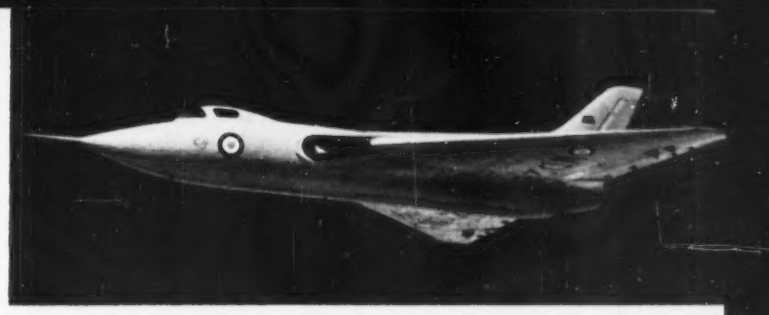
CELLON AIRCRAFT FINISHES

Keep pace with Aeronautical Development

CELLON LIMITED KINGSTON-ON-THAMES SURREY *Phone: Kingston 1234 (7 lines) Telegrams: AJAWB, Phone, Kingston-on-Thames*

Also manufactured in AUSTRALIA CANADA FRANCE HOLLAND NORWAY

CVS-773



Four types of British aircraft to be seen in the air and/or on the ground at Le Bourget: (Reading down) Avro 707A, Supermarine Swift, English Electric Canberra T.4 and Bristol Sycamore (Type 171).

BRITAIN at PARIS

Aircraft, Engines and Components on Show

THOUGH relatively few actual aircraft and engines of British make will be exhibited and/or demonstrated at the Paris Salon (only six aircraft types are probable, exclusive of those built under licence or scheduled for the international displays), a substantial showing on the part of accessory and equipment manufacturers is assured. The notes which follow were up-to-date as we went to press.

Bristol Aeroplane Co., Ltd. A Bristol Sycamore (Type 171) helicopter, powered with an Alvis Leonides engine, will participate in the civil and military flying displays. In the static show there will be 1/24th scale models of the Type 170 Mk 31, Type 171 Mk 4, Type 173 Mk 3, and Type 175 Mk 300. Additionally there will be an Olympus turbojet, a sectioned Proteus turboprop, a sectioned Centaurus 661, and a Hercules 758. Contrary to French reports, the Britannia turboprop airliner will not appear "in person."

de Havilland Aircraft Co., Ltd. A Ghost turbojet of 5,000 lb static thrust will be the key exhibit on the de Havilland stand. Four such units are installed in the Comets now used by the Union Aéromaritime de Transport, Air France and B.O.A.C. During the first year of Comet operation with B.O.A.C., Ghosts have flown 14 million engine miles. A military version powers the Sea Venom, adopted by the French Naval Air Service.

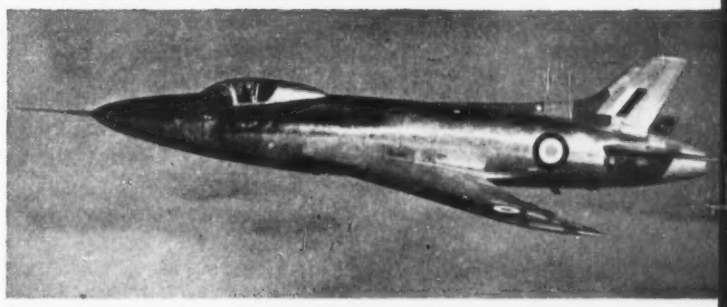
Additionally, there will be a de Havilland airscrew for the Vickers Viscount—an advanced design of constant-speed reversing type suitable for turboprops of up to 1,800 h.p. It incorporates constant-speed governing, two-second feathering, rapid and closely controlled rate of pitch-change and hydraulic emergency pitch-locking.

Also on view will be scale models of Comet 1As in the liveries of Air France and U.A.T. (this version carries 44 passengers at 490 m.p.h. at 40,000ft); a Heron Series 2 (the Series 1 is now in service with U.A.T.); a Sea Venom; and a Vampire 5, as built by S.N.C.A.S.E. and now in service in considerable numbers in the French Air Force.

English Electric Co., Ltd. A really unusual model—a half-scale reproduction of the Canberra with a wing span of 32ft 7in (a photograph was published in *Flight* last week)—will dominate the English Electric stand. Around it a series of panels will tell the story of the bomber's already long list of achievements, and a selection of the electrical equipment manufactured by the company will also be on view. A Canberra T.4, the only bomber-trainer in the world with side-by-side seating, will be on show in the open-air static display, whilst the prototype B.5 (the actual machine which made the double Atlantic crossing) is scheduled to take part in the flying demonstrations.

Fairey Aviation Co., Ltd. The main Fairey exhibit will be a full-scale V.T.O. (vertical take-off) model as fired at Woomera, with an automatic pilot from one of these aircraft as a separate display. Additionally, the company will be showing three or four of the "all-ways" adjustable chair, developed by Fairey technicians in conjunction with scientists of the Medical Research Council Unit for Research on Climate and Working Efficiency, Oxford University. A range of these seats is now being produced for the Royal Navy, the Ministry of Supply and for industry, by Fairey Marine, Ltd.

Hawker Siddeley Group. Full-scale examples of the Armstrong Siddeley Sapphire turbojet, Double Mamba turboprop and Snarler liquid-fuel rocket unit will dominate this stand. There will also be models of the Avro Vulcan jet bomber, Avro Atlantic jet transport, Hawker Hunter interceptor, Hawker Sea Hawk naval deck-landing fighter, Gloster Javelin night and all-weather fighter, Avro Canada CF-100 night and all-weather fighter, and Armstrong Whitworth (Gloster) Meteor N.F.11 night fighter. From Sir W. G. Armstrong Whitworth Aircraft, Ltd., will come a specimen machined wing. Avro participation is noted separately in the following paragraph.



A. V. Roe and Co., Ltd. Flying demonstrations will be given by an Avro Shackleton M.R.2 and by the Avro 707B. The Shackleton is a long-range maritime reconnaissance and anti-submarine aircraft, powered with four Rolls-Royce Griffon piston engines, and the 707B is a delta-wing research aircraft propelled by a Rolls-Royce Derwent turbojet. Models of Avro aircraft are referred to under "Hawker Siddeley Group."

Short Brothers and Harland, Ltd. The theme of the Short Brothers and Harland display will be the high standard of workmanship produced and an illustration of the very extensive production facilities available at Belfast. The main exhibit will be a full-scale wing section with folding mechanism which will be actually operated. A photographic display will feature the Belfast works, which has close on 1,500,000 sq ft of production floor-space, and models will illustrate the firm's research testing rig and various aircraft types.

On the flying days a Sealand amphibian will be on view in the aircraft park.

Vickers-Armstrongs, Ltd. In addition to an actual example of a Supermarine Swift Mk 4 fighter, powered with a reheat version of the Rolls-Royce Avon, there will be a one-eighth scale model of an aircraft of the same type. Also displayed will be

BRITAIN AT PARIS . . .

1/24th scale models of the Supermarine Attacker and Type 508, the Vickers Viscount and the Vickers Valiant.

Rolls-Royce, Ltd. A sectioned Derwent turbojet of 3,500 lb thrust rating, a Dart turboprop of 1,400 shaft h.p., and a reheat pipe for an Avon RA.7R turbojet, with a military type-test rating of 9,500 lb, are the principal Rolls-Royce exhibits. The company will not be participating in the flying display, but the Hispano-Suiza concern will be showing a complete Avon. An Avon will be heard, if not seen, in the Swift and a Derwent will power the Avro 707A research aircraft, likewise to be demonstrated in flight.

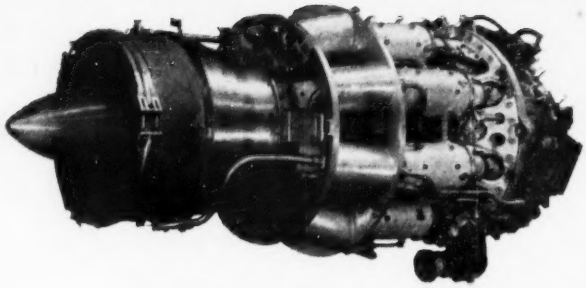
Dowty Equipment, Ltd. The following items constitute the Dowty exhibit: Vulcan main undercarriage complete with wheels, tyres and brakes; Sea Hawk main undercarriage (sectioned); Sea Hawk nosewheel undercarriage (sectioned); working electro-hydraulic panel, demonstrating electrical and hydraulic components; complete spill flow fuel-delivery unit for the Venom; various types of spill burners; sectioned Vardel hydraulic pump; sectioned ENG.129 fuel pump and mount; sectioned ENG.300 fuel pump; sectioned Hydel control valve; complete ENG.300 fuel pump; complete ENG.129 fuel pump; sectioned flow-control unit; sectioned hydraulic jacks; scaled-up models of Dowty Seals products, including bonded seals, gland seals of various sections, Seloc leakproof lock-washers and Strud leakproof bolts; and a range of electrical components.

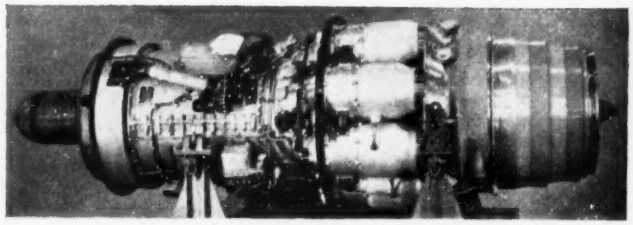
Dunlop Rubber Co., Ltd. Notable among the Dunlop exhibits will be a new aero tyre. This has a smooth and flatter tread than hitherto, and shallow dimples indicate the amount of wear. It is claimed that the new pattern gives a longer life with considerably increased resistance to tread cutting. There will also be the Maxaret automatic brake control, designed to permit maximum braking effort without wheel-locking. The operation of the unit will be shown in a short film.

Another development on view will be the 3,000 lb/sq in Mk 1 compressor, which delivers 2.5 cu ft of free air per minute. Sea level performance is maintained up to 30,000ft. Additionally there will be a fuel tank pressurization valve—shown for the first time. This maintains a constant output pressure throughout a range of input pressures varying from 6 lb/sq in to 300 lb/sq in, when air is taken from a turbojet compressor to effect fuel transfer from tank to engine. The valve prevents the tank collapsing during a high-speed dive.

Examples of the company's rubber accessories will include applications of their latest development in thermal de-icing.

Sir George Godfrey and Partners, Ltd. The following examples of this company's pressurization and air-conditioning equipment will be exhibited: CAE-7 (sectioned), two ACRE-9s (one sectioned), BT-9 and TF-10 cold-air units; Type 15 (sectioned) and Type 5/50/25 cabin superchargers; and CF-3 and AF-103 fans. The CAE-7 cold-air unit is installed in the Comet 1, and the Type 15 cabin supercharger in the Argonaut, Ambassador and Viscount. Both fans are being supplied for the Britannia. The 5/50/25 supercharger was installed in the Olympus-Canberra when it secured the world's altitude record.





Uppermost is the Bristol Proteus 705; below, the Rolls-Royce Avon RA.7.

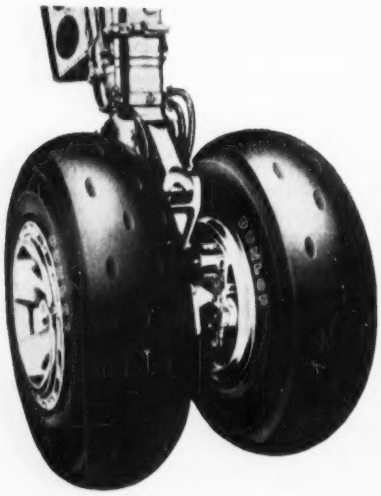
High Duty Alloys, Ltd. The stand of this company will be an adaptation of that used at last year's S.B.A.C. Display, and will present the following castings: cannon mounting for Vampire, sand-cast in Hiduminium 90; support bracket of flying control assembly for Vampire, gravity-die-cast in Hiduminium 90; bracket for flying control assembly of Vampire, sand-cast in Hiduminium 80; casing mixing valve for the English Electric Co., Ltd., sand-cast in Magnuminium 181; engine speed generator and cover for Kelvin and Hughes (Aviation), Ltd., gravity-die-cast in Magnuminium 181; body for P.V.S.O.C. unit for Joseph Lucas (Gas Turbine Equipment), Ltd., gravity-die-cast in Hiduminium R.R.50; end frame for Rotax, Ltd., gravity-die-cast in Magnuminium 220; main casing for Canberra accessory drive equipment for Rotol, Ltd., sand-cast in Magnuminium 181; and a pump body for Gloster Aircraft Co., Ltd., sand-cast in Hiduminium 20.

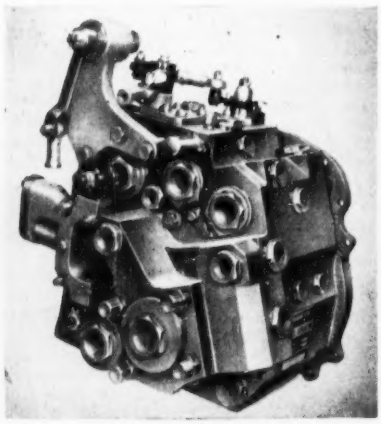
The range of stampings covers the following: impeller for Derwent 5 in Hiduminium R.R.58; shaft bracket for Rolls-Royce, Ltd., in Hiduminium R.R.56; cylinder forging for hydraulic ram for Boulton Paul Aircraft, Ltd., in Magnuminium 166; radius rod pick-up/main leg assembly for Vampire in Hiduminium R.R.66; piston-gland housing and cover for flap jacks for Dowty Equipment, Ltd., in Hiduminium R.R.56; tailplane hinge fitting for Canberra, in Hiduminium R.R.77; base attachment bracket on upper fin spar for Meteor, in Hiduminium R.R.56

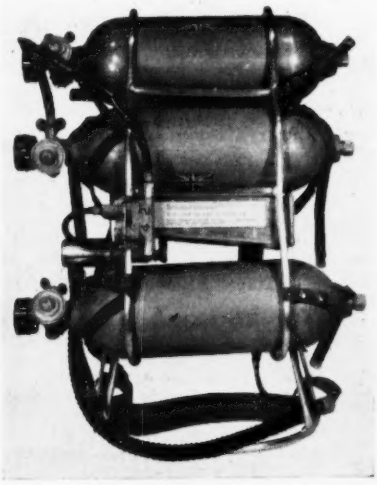
There will also be extruded sections in Hiduminium and a selection of compressor and turbine blades in the same material.

H. M. Hobson, Ltd. The Hobson exhibits will include the usual range of carburetters, injectors and gas-turbine accessories, and in addition there will be a representative selection of Integral

(Left to right) The new Dunlop tyres referred to in the text; Dowty spill-flow fuel system unit, as used on the Venom; Everest oxygen assault pack by Normalair.





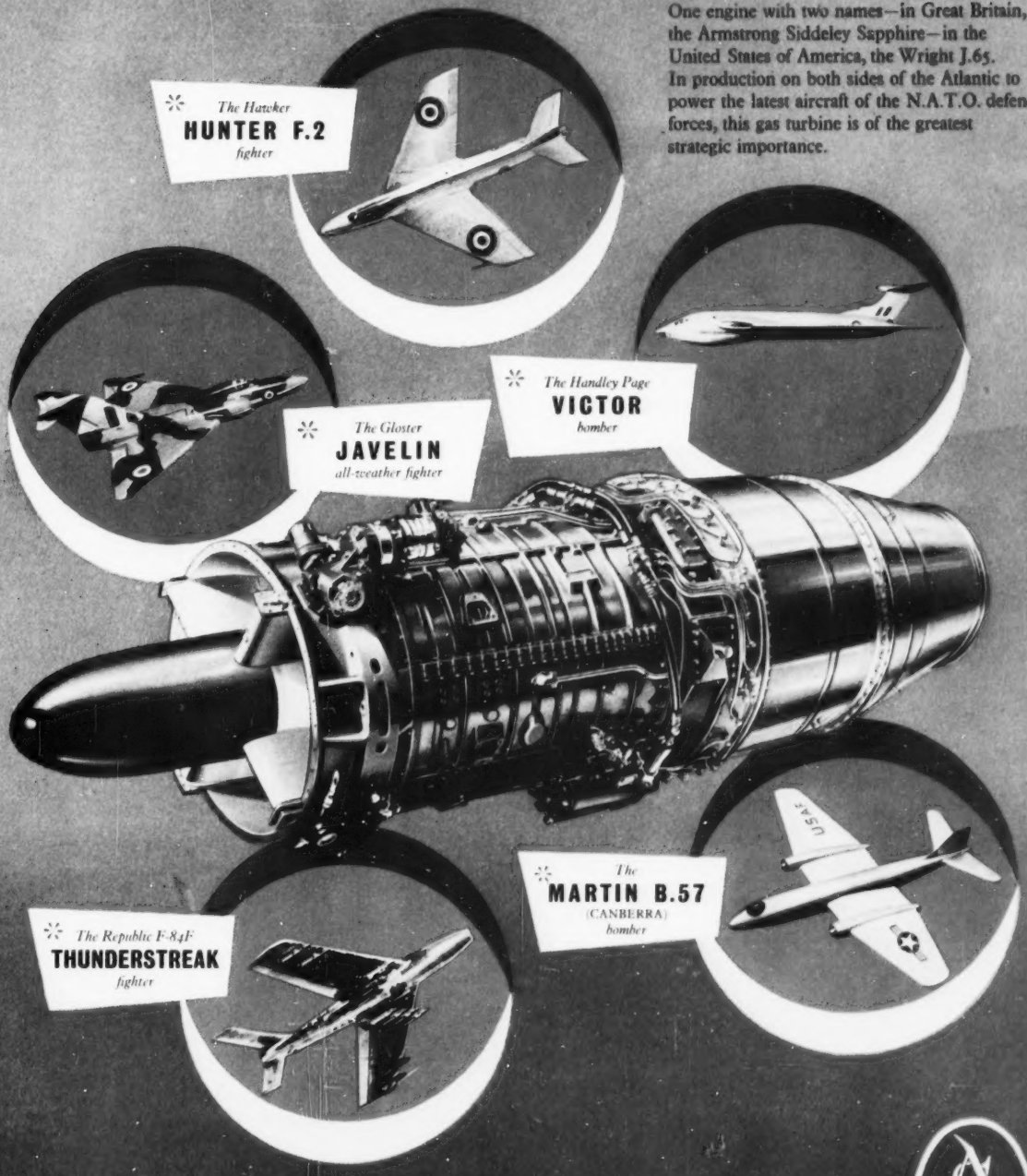


IN DEFENCE OF FREEDOM

SAPPHIRE* POWERED AIRCRAFT

–THE KEYSTONE OF WESTERN DEFENCE

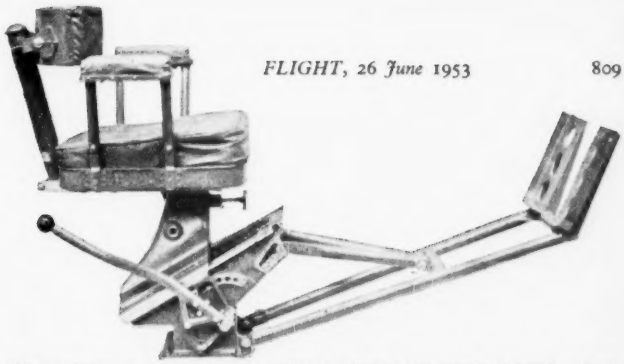
One engine with two names—in Great Britain, the Armstrong Siddeley Sapphire—in the United States of America, the Wright J.65. In production on both sides of the Atlantic to power the latest aircraft of the N.A.T.O. defence forces, this gas turbine is of the greatest strategic importance.

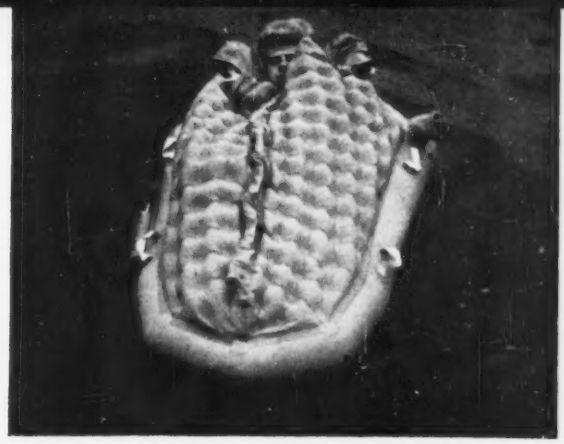


ARMSTRONG SIDDELEY MOTORS LIMITED · COVENTRY

Members of the Hawker Siddeley Group

SUPERMARINE SWIFT
The Supermarine Swift (Rolls-Royce Avon with reheat) will be the first British swept-wing fighter in squadron service with the Royal Air Force.
Vickers-Armstrongs Ltd · Supermarine Works





(Above) Fairey "all ways" chair. (Right) R.F.D. lightweight life-raft Mk 3.

BRITAIN AT PARIS . . .

hydraulic pumps and motor units. The principal exhibit will again be the powered flying control, and this year the company will be showing an actual working model of the Mk 1, port aileron type, operating in conjunction with a Hobson artificial-feel simulator. The control is a completely self-contained unit embodying a duplicated electro-hydraulic system and affording full power-operation with no proportion of the control-surface loads being fed back to the pilot. In emergency, either side of the unit is capable of independent operation, the defective half ceasing to function instantly and automatically.

Lodge Plugs, Ltd. Apart from the Lodge aviation sparking-plugs for all makes and types of engines, and igniter plugs for gas turbines, there will be the new chemical cleaner, which constitutes an entirely new method of cleaning aircraft sparking-plugs and obviates any abrasive action. It will be marketed by the company in the immediate future. Also on show will be servicing and testing equipment.

Marconi's Wireless Telegraph Co., Ltd., will have a 1/24th scale sectional model of part of a Comet fuselage as the main *motif*. Built into the model (which is the work of Westway Models, who built the half-scale Canberra) will be scale reproductions of various Marconi products.

The items of equipment to be shown, which will also be on view full-scale elsewhere on the stand, will be as follows: AD.114 pre-tuned high-frequency receiver; AD.115 140-channel remote-control transmitter/receiver; AD.107B H.F. high-power pilot-operated R/T transmitter; AD.94 H.F./M.F. receiver; AD.7092A automatic direction finder; and AD.401 intercom. equipment. Other exhibits will include a model of the company's new V.O.R. beacon (a type of equipment claimed to be unobtainable elsewhere in Great Britain), an AD.501 250-watt M.F. beacon; another AD.7092A D.F. unit set up for demonstration purposes; and a large Marconi-I.A.L. desk, as used by traffic controllers.

Normalair, Ltd. A wide range of Normalair equipment will be featured. It embraces cabin pressurization and oxygen breathing equipment, and includes some 25 sectioned models of civil and military units; a large "animated" diagram of the Comet air-conditioning and pressurizing systems; two show-cases containing an "exploded" Mk 17 oxygen demand regulator and a typical aircraft system centring round it; and a working model of the Mk 17 regulator, complete with mask. It is hoped, too, to display an oxygen pack of the type used by the 1953 British Everest Expedition. A small Type D pressure controller and its associated discharge valve, intended for use in the Comet 3, are being shown publicly for the first time.

R.F.D. Co., Ltd. A six-seat Universal life-raft Mk 1, a light-weight single-seat life-raft Mk 3, a civil life-jacket Type 50C Mk 2, an Air Force life-jacket Type 51 AF Mk 1, and a Naval life-jacket Type 50N Mk 6A, comprise the R.F.D. exhibit. The single-seat raft Mk 3, a photograph of which is reproduced, provides a high degree of exposure-protection, and it is claimed that this has been achieved without increase either in weight or stowage volume, and without reduction in seaworthiness. The combination of both flotation and exposure requirements in the one raft permits maximum utilization of the limited space available in ejector seats. The major components of the dinghy are: a buoyancy chamber; inflatable floor, providing insulation from the sea, thus conserving body heat; inflatable apron, providing insulation from the air; easy-exit apron closure; apron inflation valve; floor inflation valve; arm sleeves; two water-stabilizing pockets; topping-up valve and bellows; a drogue, which causes the survivor to float back to wind; gas cylinder and inlet valve; and water-activated light.

Rotol, Ltd. A particularly appropriate exhibit on the Rotol stand will be an airscrew for the Breguet Vultur, an article on which appeared in *Flight* of May 15th. This airscrew is a four-bladed type and has a controllable lock which enables an ultra-fine pitch to be selected for starting, idling and landing. A second airscrew will be an eight-bladed co-axial for the Fairey Gannet.

There will also be a controller unit and feathering unit, a fuel-flow proportioner, a composite airscrew blade and a rebated blade. This last is basically a duralumin blade on which the leading edge is machined back along the inner two-thirds of its length to accommodate an overshoe containing the electric de-icer heater elements. Additionally there will be a gearbox for the Comet 2. A unit of this kind is driven by each of the four Avons and each box drives an alternator, alternator cooling fan and hydraulic pump.

Sperry Gyroscope Co., Ltd. Although this company is not itself exhibiting, its French distributors—S.E.C.A.I.—will have a tent on the airfield where information will be available on Sperry aeronautical instruments and equipment.

Standard Telephones and Cables, Ltd. are showing a considerable selection of radio equipment. In the V.H.F. field, there will be an STR.9X ten-channel, pilot-controlled unit which covers the 115-145 Mc/sec band, and a ten-watt STR.12D set which provides 140 crystal-controlled channels in the I.C.A.O. band of 118.1-131.9 Mc/sec. All Air France aircraft are being fitted with this latter equipment.

The most important exhibit, however, will be the new V.O.R. receiver, the SR.31, which provides 100 channels in the 108-118 Mc/sec band. V.O.R. has, of course, been "standardized" by I.C.A.O., and the company claim to be the only manufacturers of such equipment in Europe. The set has one indicator combining the functions of the two on current American units, and output is available for feeding into the vertical needle of an I.L.S. meter.

Another exhibit is the STR.30 radio altimeter, which has ranges from 0-500 and 0-5,000ft, and is claimed to be accurate to within 2ft or 3 per cent, whichever is the greater.

The STR.19 four-channel H.F. equipment, which operates through the 2.4-12 Mc/sec band, will be on view, and it is understood that a 12-channel version is to be available in the near future. Yet another exhibit will include SR.14B/15B I.L.S. receivers and complementary three-lamp marker unit. There will also be a range of crystals, suppressor capacitors and thermistors.

Teleflex Products, Ltd. The French branch of this company—Teleflex, Department de la Cie. Tiss-Metal Lionel-Dupont et Cie., 51 Quai de la Seine, Paris, 19e—will exhibit the latest developments in Teleflex remote-control systems, with a working layout of typical current aircraft installations and specialized cockpit control assemblies. A wide range of other components and test-bed equipment will also be presented.

Thermionic Products, Ltd. An installation of the multi-channel airport recorder, now being delivered in quantity to the Italian and Royal Netherlands Air Forces, will be the centrepiece of this company's stand. The Australian Civil Aviation Department has installed similar equipment for evaluation. The equipment affords automatic recording facilities for air traffic control, and the system chosen is magnetic, the basic unit being a 4 hr tape "deck," actuated by a comprehensive control unit.

The recorder provides a listening watch on as many as 14 channels simultaneously. It is stated that all other types of recording so far tried out for this application involve the use of a complete installation for every channel recorded.

Also on display will be samples of quartz crystal units in various stages of manufacture. These are the products of the associated company, the Brush Crystal Company, who are now delivering quartz crystal units in quantity from their new plant at Hythe.

Ultra Electric, Ltd. Turbojet and turboprop electric controller systems are being shown in addition to "Sarah" (search-and-rescue and homing). Sarah consists of a miniature beacon transmitter (sewn into an aircrew lift-vest or included in other survival equipment) which emits groups of coded pulses. These are received aboard searching aircraft or ships and displayed on a C.R.T. in conjunction with a fixed vertical trace so as to give a left-right indication for homing.

Our American Correspondent Reports . . .

BRITISH commercial turbines are news again. One would think that after four years of discussion, prophesy, assumption, praise, deprecation and wild crystal-ball gazing, people here would be wearied of making statements about what the British aircraft industry was doing and what was going to happen; particularly as 75 per cent of what has been said so far has been proved wrong.

But not a bit of it. The past few weeks have produced a fresh rash of speeches and interviews, one of which showed a calmer and more reasoned approach than usual. This (not surprisingly) was from a manufacturer who will himself be in the commercial turbine field before long—Mr. Wellwood Beall, senior vice-president of Boeing Airplane Company—who gave an interview to an intensely nationalistic weekly magazine called *U.S. News and World Report*. Unfortunately, this particular publication never misses a chance of having a crack at the British, but the only time Mr. Beall appeared to be stepping a narrow path was when he was asked if the British Government subsidized jet-transport development. He replied : "The de Havilland Comet was ordered by the British Ministry of Supply before they actually started to build one."

Of his other answers those of most interest to British ears were : "It will be hard to catch up with the British on some of the markets they have captured", and "Their market lead can be recaptured . . . my guess is that by 1960 the market could be evenly divided . . .", and "This prototype [the Boeing jet tanker-transport] and its testing will cost us between 15 and 20 million dollars," and "There is very little risk [of cabin pressurization failure] but we should not like to operate our commercial transports at much higher than 40,000ft until we have accumulated considerable experience at that altitude." To a question as to whether British safety standards were lower than American he replied "not necessarily. They are different." As would be expected, he backed the pod configuration for engines, but said he did not think the noise problem for those on the ground would be as bad as some people made out.

◆ ◆ ◆

A SOMEWHAT different tone, however, was adopted by Mr. Mansfield Horner, president of United Aircraft Corporation, in a speech at Dallas. In discussing the economy of turbine engines he is reported to have said : "Today it is our belief that we not only have pulled abreast of the British in the last two years, but in actual fact have passed them. We have in production at this time advanced American turbojets that are definitely ahead of any known foreign competitor . . . ours have the highest thrust and considerably better fuel economy." In discussing military development he is reported as saying : "We have all . . . been aware of the British selling of their overall superiority in this jet age. May I ask just one question? Whose jets have been able to cope with Migs in Korea? If the British had anything to compete, you can be sure they would have them over there. But it is only U.S. Sabres that are now doing the job . . . This fact is pretty indicative of quality." In surveying British civil turbine aircraft developments he said that only three types have "emerged as really significant," and he paid high tribute to British salesmanship by saying that they were almost as well known in the United States as was any American aircraft, "despite the fact that the first has only seen supplemental service, the second hardly any flying service, while the third is flying as a prototype only." (He was speaking of the Comet, Viscount and Britannia respectively.)

All of which probably made both Mr. Horner and his audience feel fine, provided they did not think the thing through any further. For nowhere in his speech was there mention of some of the more important factors that govern the economics of commercial turbine operations. It is a pity that there still seems to be considerable ignorance here as to how far British engines have actually progressed in the war of specific weights, fuel consumptions and overhaul life.

BUT the open season for tail-twisting is not confined to the engine manufacturers. Captain Rickenbacker is back in the act again in an interview published in *Aviation Week* for May 25th. [as reported in *Flight* of June 12th.—Ed.]. As readers will remember, "Captain Eddie" paid a visit to England last September and, on returning to the United States, made some rather astonishing statements about British production—statements which were disproved by subsequent British deliveries to operators who were serious about their procurement programme. Nevertheless, in this latest interview he has given his current ideas on jets—none of which are very complimentary to either de Havillands or Vickers. He says : "If the Comet had proved up to what I hoped for, and needed, I would definitely have bought them . . . But the economics are just not there, performance is not there, capacity is not there and the Comets are not there," (which must, one feels, be very confusing for B.O.A.C.). And in discussing jet engines in general he says : ". . . in another five or six years they may be able to get 500 hours between overhauls. But they are figuring the cost anywhere from 12 to 20 per cent of the purchase price for each overhaul. . . ."

Had Capt. Rickenbacker pointed out that for most of his long-haul runs to Florida he needed very high density and great economy, he would seem to have been on safer ground, for in the same issue of the magazine—some 22 pages further on—the editor himself says "New contracts for the de Havilland Ghost engines in the Comet 1s call for 600-hour overhaul periods and a guarantee of $10 per flight hour total cost, parts and labour."

◆ ◆ ◆

RECENTLY the new DC-7 took the air. American Airlines are hoping to get their first, fully certificated, by October of this year; and as the chief differences between this aircraft and the DC-6 are the engines (the DC-7 has Wright compounds, which are said to be giving blower trouble at high altitudes), longer fuselage, and improved controls, this certification might be done by that time if the engines are ready. Two other aircraft are almost ready to fly and an intensive programme can be kept up all the summer. The first flight was of over two hours' duration, so there could not have been much wrong with No. 1 aircraft. Knowing how experienced Douglas are at developing a "progressive" and "well-tempered" aeroplane, this is not surprising. The aircraft itself has an all-up weight, for domestic operation, of 122,200 lb with an estimated cruising speed of approximately 360 m.p.h. The seating capacity is 70 to 95 passengers: 58 DC-7s are ordered.

There is also a rumour, not denied, of yet another Constellation development. This will be a super-long-range job, presumably designed to do 3,000 or 4,000 miles, perhaps plus alternates. As a "Connie" with wing-tip tanks has already been flying, the extra tankage may well be carried in that fashion. So far nobody has said anything about engines, but if the machine was needed soon it would probably have to have Wright compounds, too, which would mean that the chief development problems on the airframe would be increased all-up weight and a higher wing-loading. If this new model does appear in the next two years it should find a market, although by 1956 the Britannia will be treading hard on its heels.

The only other possible new aircraft that is being discussed is a turboprop development of the Convair. Apparently Consolidated have been canvassing some of their existing, or possible, Convair owners for reactions to such a development. On the face of it this looks more like a holding operation than a serious suggestion. As it is, the Convair range is marginal for certain operations, and the Allison T.38 is obviously unsuitable (the single-engine performance would be under that required) which would mean either four engines or bigger engines, for which the present design would hardly carry enough fuel. Nevertheless, it is always possible that the Convair-Canadair team may well be working on some development of this nature—particularly as rumour suggests that the latter firm have abandoned the C.L.21

◆ ◆ ◆

THE recent British height record did not get much of a press in the States. Nor, for that matter, did the fast North Atlantic delivery flight of two Canberras to Venezuela. This seems a pity. We are so frequently accused these days of playing up our turbine achievements beyond their actual value (and maybe there is a grain of truth in such an assertion) that when we do a fine flight or record we should ensure it gets a decent press. But press relations in America are an all-time job, and because there is no British aircraft industry organization here to take care of such matters (the motor trade do have a representative) it falls on the shoulders of the firms themselves, or onto the British Information Services. This latter organization, which comes under the Foreign Office, does a good job of distributing British news, and maybe full advantage is not being taken of its resources. But it's hard to expect a non-technical organization such as this to know all the various facets of something like the aviation Industry and to be able to pounce at once on a happening and exploit it without some technical advice either from the manufacturer or someone in touch with current developments.

The Bordeaux-Merignac factory of Marcel Dassault, with a line of Ouragan fighters on the left and Flamants on the right.

FRENCH ORIGINALITY

National Products at the Show: a Critical Preview

By JAMES HAY STEVENS

THE XXth Salon promises to reveal a realistic revival in the French aircraft industry commensurate with the realism that has led to the desertion of the cramped, if nostalgic, venue of the Grand Palais for the open spaces of Le Bourget. The period since the last Salon has been a difficult one for the French aircraft industry, with the economies of succeeding governments directed at the air vote, so that the small production orders have had to be spread around the various factories of the nationalized companies. The private firms have had an even tougher time, but somehow the majority have survived and there has even been a revivial of two historic names, Farman and Potez, while Marcel Dassault and Hispano-Suiza are actually flourishing. The harsh facts of life have resulted in the 1953 Salon revealing fewer prototypes, perhaps, than in the past, but also fewer fantasies and more solid worth.

The NATO agreements relegated the Armée de l'Air mainly to close-support duties, so that military thought has been directed principally to developing ground-attack aircraft.

First there was the Vampire licence acquired by the S.N.C.A.S.E., which led eventually to the modified, Nene-engined Mk 53, the Mistral. This was shown at the last Salon, but not in its fully modified form. It now has an ejector seat, improved air intakes, a remarkable amplitude of plenum-chamber doors (about 1 sq m), and a fuel system giving a slighty greater endurance than that of the Goblin Vampire. The large plenum doors give an improved take-off thrust, while the modified intake has raised the maximum speed to 575 m.p.h. and the critical Mach number by about 0.02.

The Ouragan-Mystère series were designed primarily as intercepters, but the fighter-bomber rôle was not overlooked in their equipment. The Ouragan is now in full production for the Armée de l'Air (which has just released some of its order for the Indian Air Force) at the Dassault factory at Merignac near Bordeaux and in the plants of nationalized companies in the Paris, Toulouse and Bordeaux areas. The Ouragan is an excellent flying-machine, but its structure does not facilitate production, since the aeroplane was originally designed very quickly so as to get in first and corner the market.

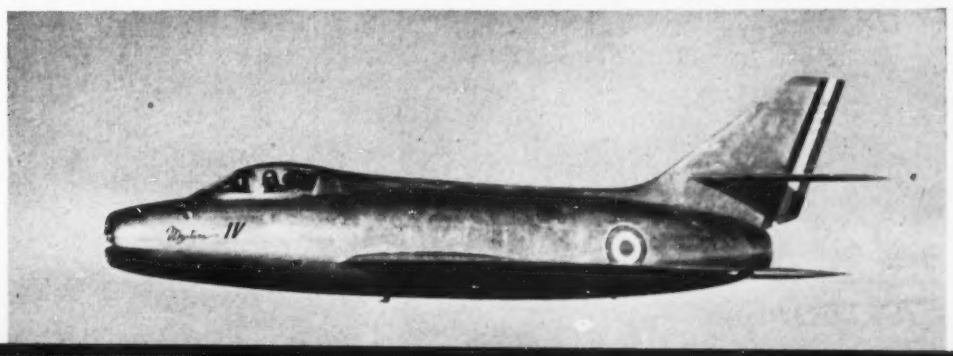
The much more robust Mystères—which really bear only an external aerodynamic resemblance to the Ouragan—have been designed with more of an eye to production. The Mk IV will be new at the Salon. It has a thinner wing and greater sweep than the earlier Mystères, and the Jacotet hydraulic boosters on the controls are supplemented by a flying tail. The latter may not actually be operative on the prototype to be demonstrated at Le Bourget, but it will be on all production Mk IV aeroplanes and may be fitted to the Mk II as a modification. An interesting innovation is the Hunter-like spine on the fuselage. This was added as a result of flight trial and it has prevented turbulent eddies from the cockpit hood stalling the lower part of the fin.

The current Mystère IVA has the 6,250 lb s.t. Hispano-Suiza Tay centrifugal and is comparable in performance with the Sabre or Mig-15. Another prototype is nearing completion with an Atar 101 axial and a two-position afterburner.

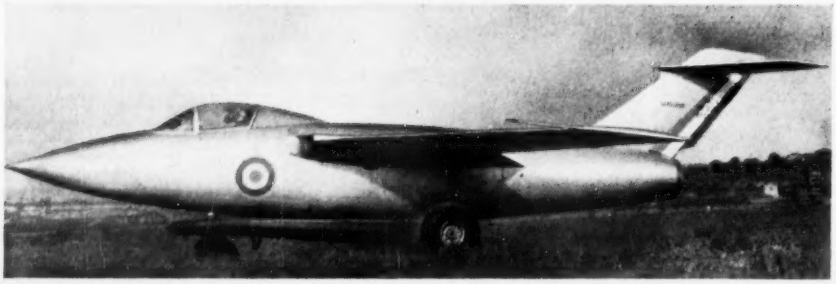
At present the picturesque Dassault factory at St. Cloud is making a pre-series of 75 Mystère fuselages and their other Parisian factory at Argenteuil is building 50 sets of wings, prior to full-scale NATO production in nationalized plants. The St. Cloud factory is principally an experimental shop and is also engaged on the prototypes of the Mystère IVB with the Rolls-Royce Avon 9 and an F-86D-style nose and the Mystère IVN, an all-weather version.

Four new ground-attack prototypes will be on view, two of which are of radical and imaginative design. The S.N.C.A.S.E. S.E. 5000 Baroudeur is a very unusual conception indeed and owes its origin to the ideas of M. Georges Hereil, President of the company. Studying the reports of Korean operations, M. Hereil —who, though no technician, is a very astute businessman— decided that current efforts to achieve high-speed performance while neglecting the other end of the speed-range were not only misdirected, but were in danger of defeating their own ends. He personally conceived the idea of a rocket-launched aircraft landing on skids—so reviving the principles of the short-lived Me 163 and Ar 234—and engaged Mr. W. J. Jakimiuk to carry out his ideas. The latter is, of course, the designer of the D.H.C. Chip-

Dassault Mystère IVA. Note the spine, which prevents eddies from the cancpy from stalling the base of the fin.



FRENCH ORIGINALITY . . .



(Right) S.E. 5000-01 Baroudeur. The aircraft is seen in its final form, but the trolley lacks the "follow-through" nose cradle. (Below) the Potez 75.

munk and Beaver and the adaptor of the Vampire Trainer, the fuselage of which was transplanted to the Sea Venom.

The Baroudeur is a relatively conventional swept-wing monoplane, save that the wing is placed rather high. The cockpit, which is pressurized against a possible intercepter rôle, is well forward and a sloping pointed nose gives a downward view of 17 deg. There is heavy armour and an ejector seat. The wing is very thin—less than 10 per cent—so that all equipment and fuel have to be carried in the fuselage. There is provision for underwing loads of bombs, guided missiles, or drop tanks and also a scheme for forward-projecting tip-tanks. Thirty-millimetre cannon are mounted in the bottom of the fuselage.

All controls are operated through Jacotet hydraulic boosters, with two-speed electric motors for trimming. This arrangement gives an electrically-operated reserve power system if the hydraulics fail, and also a "last ditch" manual control, since the Jacotet jack locks solid as a strut if pressure fails. The tailplane is power-operated and is likely to be used as the main pitch-control, with the narrow-chord elevators for trim only.

Structural design is based on simplicity for large-scale manufacture and the prototypes have been made on production jigs. The fuselage is broken down into small panels complete with extruded stiffeners, part frames, and plumbing. The wing and tail have the skin panels made as units with their stiffeners for assembly to the spar-rib structure. The wing is made in two parts bolted to fittings mounted on the main fuselage frames. Instead of the torsion-box structure to which one has become accustomed there is a single beam for bending loads at about 45 per cent chord, with light front and rear false spars for aileron, flap and slat loads, which also form, with the skin and ribs, the torsion-bearing structure. Instead of the multiple-bolt root joint —as on the Sabre—there are only four bolted fittings. The top main spar has a horizontal bolt, so that, by using a mild steel assembly pin, it makes a hinge for assembly in the field without special equipment while the lower boom and false-spar bolts are being fitted. This feature is typical of the thoughtfulness with which Jakimiuk has designed for simple maintenance as well as easy fabrication.

The ailerons are of the pressure-balanced type, despite hydraulic boosters, and there is a tab on the port one. Because of the thinness of the wing the hinge bearings and operating joints protrude through the skin, but wind-tunnel tests suggest that they will lie within the boundary layer. The flaps, which extend between the ailerons and fuselage, are of the slotted extension type, ingeniously pivoted at the root to form plain split flaps. The reason for this is that the triangular trailing-edge root fairings form the air brakes. These are hinged at their middles so that they are aerodynamically balanced and, since they lie almost on the thrust line, they should cause very little change of pitching moment.

The S.N.E.C.M.A. Atar axial is very neatly installed on trunnions in the rear part of the fuselage. The tail and rear fuselage are removed as a unit there being a four-bolt attachment with quick-release connections for the controls, electrics and hydraulics. The wing-root intakes have notable efficiency up to high subsonic Mach numbers. The two ducts turn in ahead of the main wing-spar and join in a single trunk to the compressor eye. The boundary-layer bleed air enters the fuselage for accessory cooling and is exhausted round the jet-pipe by induction. The neat shape of the air ducts, set high in the fuselage, leaves an unusually "solid" volume for the fuselage fuel tanks.

The greatest interest in the Baroudeur, however, lies in its alighting gear and take-off trolley. There are two main skids (or skis) on the "corners" of the fuselage and one under the tail. They are, of course, retractable, and are magnesium-alloy castings with replaceable steel shoes heat-insulated from the magnesium by a layer of plastic. In the D.H. tradition, rubber blocks are used for shock-absorbing; one set works in torsion for springing, with compression rubbers fore and aft to replace tyre resilience. The running and shock-absorbing properties of this alighting gear have been tested on a full-scale mock-up which was dropped, shot off a ramp and, finally, launched at over 100 m.p.h. from the take-off trolley. The designer is confident about its effectiveness and says that even on the rough flints of Istres shoe-life is comparable with that of tyres, while on grass it is greater. The friction of the skids permits landings of a few hundred yards on almost any surface that is roughly level.

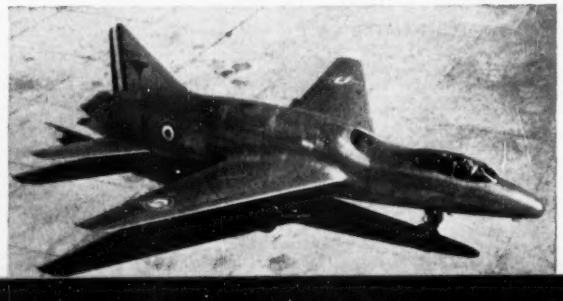
The take-off trolley, which looks simple enough, took a year of careful design to evolve. It has a steel-tube frame and a tricycle undercarriage with large-diameter medium-pressure (35 lb/sq in) tyres. The twin front wheels are free to castor for ground handling, while the main wheels have differential brakes operated from the rudder pedals. Two or four rockets are used for take-off, according to load and terrain, with two always in reserve. On test the trolley has been accelerated to 140 m.p.h. and films prove that it will run true, with or without load, on surprisingly rough ground. The cumbersomeness on the ground of the Ar 234A and Me 163 were their weakest features; but the Baroudeur, it is claimed, can be mounted on its trolley in little more than a minute. A keel runs along the fuselage, right up under the nose. The Jeep towing the trolley uses its power take-off to winch the aircraft up on to the trolley over spiral rollers that automatically centre the keel. Side-pads steady the aircraft at the rear, and a front support holds the nose, while it is locked on to the trolley by a bomb slip.

At take-off, the pilot opens the throttle and fires the rockets; when take-off speed is reached a warning lamp lights and he releases the bomb slip. He then increases incidence, the front support following the nose as it rises, and then he flies off. The trolley brakes are automatically applied and arresting tines lowered into the ground stop the trolley in less than a hundred yards. These tines are double-ended and are mounted at their mid point on a spring-loaded pivot so that, should one encounter a stone, it will turn over and present its other end instead of breaking. S.N.C.A.S.E. claim that full-load take-offs can be made in less than 1,000 yards—even less at intercepter weight.

Data on the Baroudeur is, naturally, still very much restricted. The designer claims that the equipped weight is about 1,000 kg less than that of the Mystère and between 1,500 kg and 2,000 kg less than that of the Sabre. All-up weights vary widely between the intercepter rôle with cannon and limited fuel at about five tons, the attack version with full internal tanks and rockets, and the ferry or escort mission with under-wing and tip tanks. The span is 32ft 10in, length 44ft 3in, height 10ft (on skids) or 11ft 10in (on trolley), skid track 4ft 4in, fin sweep 55 deg, and tailplane sweep 42 deg.

The resuscitated Potez company is showing the Potez 75, which is a ground-attack two-seater intended for "Home Guard" aviation. Because it is to be flown by week-end pilots it has been

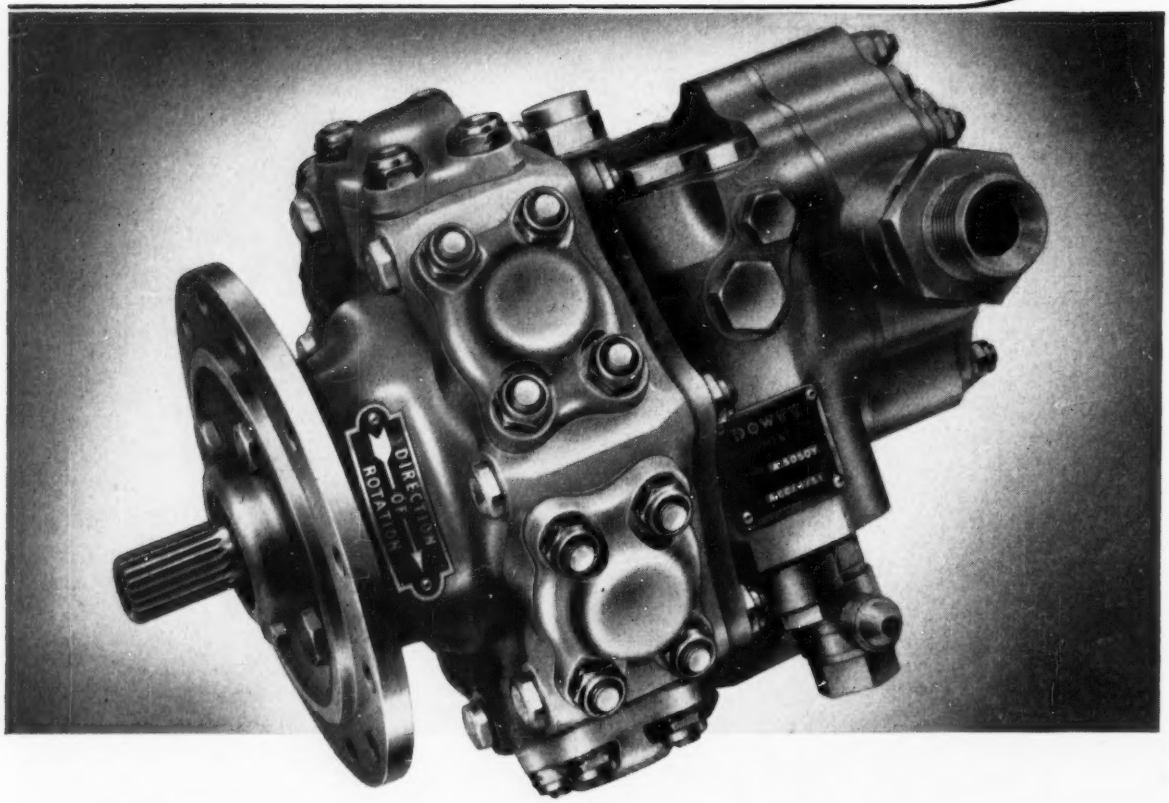
(Left) S.E. 2410; (below) S.E. 2415.



MARCONI'S WIRELESS TELEGRAPH COMPANY LTD • CHELMSFORD • ESSEX

Marconi are exhibiting on Stand No. 6 at the Paris Aero Show

—the only pump, M.O.S. approved, for operating on WATER-BASED FLUIDS at 4,000 lb. per sq. in.



Vandel **DOWTY**

4,000 lb. PER SQ. IN.

HYDRAULIC PUMP

DOWTY EQUIPMENT LIMITED · CHELTENHAM

First production N.C.856 A.O.P. (Regnier 4LO).

FRENCH ORIGINALITY . . .

designed to be very easy to fly. It is a low-wing pusher monoplane with a fixed undercarriage. The tail is carried on booms, with the tailplane mounted high on top of the fins. The fuselage, which is heavily armoured, has an enclosed cockpit in the nose for the observer and an open one behind for the pilot, while at the rear there is the inverted vee air-cooled Potez 8D engine. It is quite a bulky aeroplane, since the span of the untapered, thick wing is 13 m (42ft) and one would expect it to be both heavy and slow, since it is expected to carry an armament of two 30 mm cannon and two anti-tank guided missiles.

Barring accidents, both the S.N.C.A.S.E. Grognards, the short-nosed S.E. 2410 and long-nosed S.E. 2415, are to be presented in flight. These aeroplanes were flying before the last Salon, but were prevented from participating because of security restrictions. They represent an interesting attempt to solve the twin-jet installation problems. The two engines, Hispano-Suiza Nenes, are mounted in the fuselage, one ahead of and above the other, in a common plenum-chamber. This arrangement makes the fuselage bulky and concentrates the weight on the centreline—with consequent advantages and disadvantages—but it leaves the wing unobstructed and aerodynamically "pure." The Grognard specification called for a large machine to carry a heavy load a long way, and it is consequently a bulky aircraft. The unusual dorsal air-intake is efficient, although there was some preliminary trouble with stalled air during yawed flight; this was satisfactorily cured by fitting baffles. Leading-edge flaps, designed *ad hoc* without previous experience, proved effective and are trouble-free. Wing fences have been fitted to counteract the spanwise spread of the stall which is characteristic of many laminar-flow aerofoils. The wing is thin, so the fuselage carries all fuel and the undercarriage as well as guns, ammunition and a large rocket-bay. The low-placed adjustable tailplane has proved effective at all speeds. A tail brake parachute was envisaged in the original design and has proved most successful.

It is not generally known that the Grognards have an unusual control system; instead of a stick or a wheel operating the ailerons and rudder the arm-rests on each side of the seat are used. The gearing is arranged so that the movements follow arcs that are comfortable for the arms—fore-and-aft for the elevator, one-up, one-down for the ailerons. This idea was evolved by the chief engineer of the Toulouse factories of S.N.C.A.S.E., M. Pierre Satre, in an effort to overcome the customary obstruction of the instrument panel by the stick. On the ground the controls feel perfectly natural and, apparently, pilots have in general praised the arrangement and none has experienced any difficulty in getting used to them.

The fact that the Grognards* fully fulfilled their specification did not secure a production order, because the requirement was dropped by the Armée de l'Air before flight trials had been completed. Data for both the S.E. 2410 and the S.E. 2415 are now unrestricted :—

	S.E. 2410	S.E. 2415
Span	44ft 7in	51ft 11in
Length	50ft 6in	55ft 3in
Height	19ft 3in	19ft 3in
Sweepback, leading edge	47 deg	32 deg
Wing area	496 sq ft	476 sq ft
Basic weight	24,510 lb	29,270 lb
Gross weight	32,190 lb	31,090 lb
Speed, sea level	652 m.p.h.	606 m.p.h.
20,000ft	644 m.p.h.	590 m.p.h.
30,000ft	624 m.p.h.	569 m.p.h.
Climb, sea level	5,300ft/min	5,300ft/min

Max. permissible weight 18 tonnes.

The S.O. 4050 Vautour, produced by the S.N.C.A.S.O., is a relatively conventional twin-jet with a thin swept wing and underslung nacelles. It has few outstanding features other than its general aerodynamic cleanness and it bears little resemblance to the preceding S.N.C.A.S.O. designs, such as the Espadon and the S.O.-4000. An unusual feature, necessitated by the thin wing, is a bicycle undercarriage with fuselage main wheels and balancing wheels in the nacelles.

In its present form the Vautour has a long canopy covering two ejector seats, but there will also be a single-seater version. In addition to 30 mm cannon in the fuselage, there is a large bay for bombs or guided missiles. The very large tail surfaces are more akin to British than Continental practice. The engines are S.N.E.C.M.A. Atar 101s. The Vautour has been ordered into production.

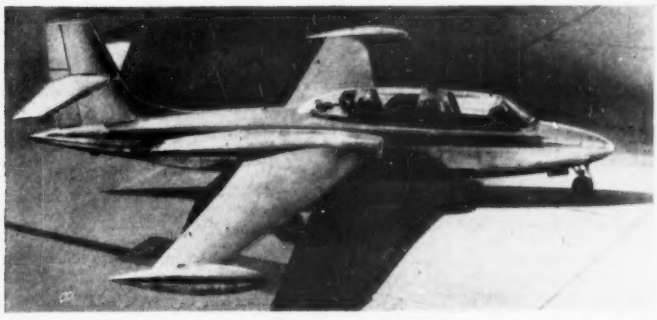
Another military—or more precisely, naval—type to be on view is the Bréguet Vultur, which was fully described and illustrated in *Flight* for May 15th (pages 606-608).

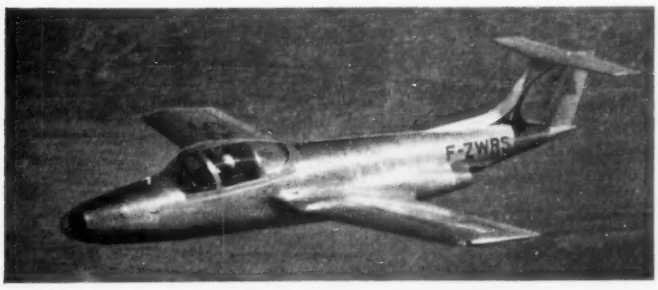
In the lighter military field there is the production version of the N.C.856, which is the French idea of what an Auster should look like. This rather ungainly looking aeroplane has been developed from the N.C. 853 Cub. This was a light two-seater designed by the defunct S.N.C.A. du Centre and now taken over by the S.N.C.A. du Nord. The N.C. 856 has a tube-and-fabric fuselage and fabric-covered light alloy main wings. The tail has twin fins and rudders, which give a remarkable amount of control below the stall. The shoulder wing and ample glazing give the crew an exceptional view both upward and downward, although the engine tends to blanket the forward view in slow flight. Fitted with a 140 h.p. Regnier 4LO inverted in-line engine, the N.C. 856 has a moderate performance. Span is 40ft, length 24ft, height 7ft, wing area 183 sq ft, tare weight 1,432 lb, gross weight 1,984 lb, max. speed 118 m.p.h., cruising speed 105 m.p.h., minimum speed 43 m.p.h., and endurance 1 hr.

Unlike this country, France can show several new light aeroplanes, both in the normal and the ultra-light categories. There is now a two-seater version of the Bébé Jodel, still with the characteristic turned-up wing-tips. The Jodels and several other types are available for purchase and there are also a number of attractive prototypes, which is a remarkable achievement in a country where finance and costs have run amok.

France is also to be congratulated on a flying start with light jet trainers. Following the S.I.P.A. 200, Minijet, shown partly finished at the Grand Palais in 1951, there came first the Fouga CM-170R Magister and then, early this year, the Morane Saulnier M.S. 755 Fleuret. All three are aeroplanes of character—and they owe their origin to men of character. The Minijet is the work of the brilliant and dynamic Yves Gardan, whose Minicab and S.I.P.A. 901 are two of the most delightful light aeroplanes in the world. The Magister is the result of the persistent application and vision of Pierre Mauboussin, one of the most pleasant personalities in French aviation, and follows the tradition of his jet-gliders with their high aspect-ratios and butterfly tails. Behind the Fleuret lies a 40-year tradition of making trainers for the French services. All three owe their existence to the genius of Joseph Szydlowski which produced the Turboméca light jet engines.

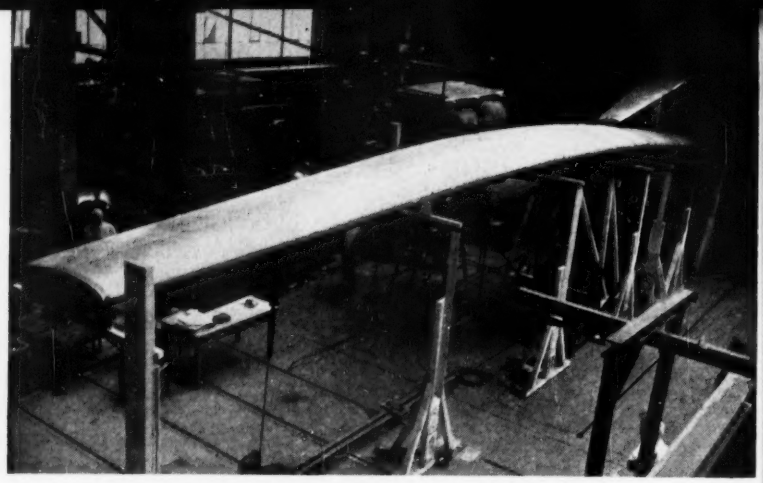
The Minijet is the tiniest aeroplane and, with its tail booms, the most unusual. Even with high-lift double-slotted flaps its





(Above) Fouga C.M. 170R-02, showing the new conventional tail for comparative trials with the "butterfly." (Below) Morane Saulnier M.S. 755 Fleuret.

* *A word about the picturesque names chosen by S.N.C.A.S.E. would not be amiss. "Grognard" was a name given to soldiers of Napoleon's Old Guard and is most nearly rendered as "old sweat," while "Baroudeur" means a bold fighter of the Foreign Legion, being derived from the Arabic "baroud," meaning "battle."*



(Left) A show model of the S.E. 210 Caravelle (Avon 16s). (Above) A wing for the Hurel-Dubois H.D. 31 under static test.

FRENCH ORIGINALITY . . .

wing area looked inadequate, and the second machine, ordered for official trials, has an extra metre of span. The Magister is comparatively large and is very slender. There is a Marboré of 880 lb s.t. in each wing root, so that there is half as much power as in the early Gloster F9/40 and the Me 262. The butterfly tail allows the crew to escape without the need for ejector seats. A development series of five is being built by the S.N.C.A.S.E. at La Courneuve. The Fleuret is similar in power to the Magister, but has side-by-side seating. The weight of ejector seats has been saved in this case by a system rather like that on the Beaufighter; after the jettisoning of a hatch in the floor, an aerodynamically-balanced trap is lowered and the seats tip backward to precipitate their occupants through the bottom of the fuselage.

Among the transports, the S.N.C.A.S.E. Armagnac and the Nord 2501 will be shown and demonstrated once again, but the Hurel-Dubois H.D.31 will be making its first appearance in full-scale form.

Commandant Maurice Hurel, who is a naval pilot of many years standing and was designer of the old CAMS company, showed the writer his prototype and explained his ideas in designing this curious and controversial aeroplane. The fundamental feature is the use of a wing of an ultra-high aspect-ratio to reduce span loading and improve the lift/drag ratio, so giving a good take-off and very economical low-power cruising. Cmdt. Hurel's design calculations are very convincing on paper and have, apparently, been exceeded in flight tests, so perhaps one can assume that his principle has been established. Whether its application provides a practical aeroplane has still to be proved in operational service.

The H.D.31 has a span of 148ft, a length of 72ft and is 22ft high—that is to say, although the fuselage is about the size of a Bristol Freighter's, the wing is as large as that of a Stratocruiser, while the weights and load are about the same as for a Dakota. With two 800 h.p. Wright C7BA1 engines, the H.D.31 cruises at about 155 m.p.h., but the H.D.32 with 1,200 h.p. R-1830s will have approximately the same performance as a Dakota. To get the performance the wing is a 20 per cent thick laminar-flow section of the N.A.C.A. 63 series, with a stable centre of pressure and fitted with double-slotted flaps Because of the large span, these flaps are very effective at take-off and on the climb, 30 deg and 20 deg being used respectively.

Low span-loading gives a very favourable lift/drag ratio when cruising and compensates for the drag of the lift struts that are necessary to keep down the wing structure-weight. These struts have the same aerofoil section as the wing and virtually make the Hurel-Dubois a biplane. In order to achieve comparator accuracy (0.01 mm in 25 mm) on the forward half of the wing, the 16 s.w.g. skin is made in panels round the leading edge, which are stretch-formed past the elastic limit to the true profile. A special type of countersunk rivet is also used to avoid breaks in the contour.

The fuselage has an excellent stowage volume with a square-sectioned uninterrupted space. The flying controls and flap gear are run along the roof, where accessibility is excellent. The cockpit strikes one as a pilot's design: well-placed instruments and controls, ample windows, and wingtips visible—the engines, too, when a new side window has been fitted. Two features are of particular interest: throttle levers that are pushed forward and downward at 45 deg to save the space needed for quadrantal movement, and a transparent panel over the fuse box, in which double fuses are used which show red when they have been replaced.

Cmdt. Hurel argues that simplicity of maintenance, fixed undercarriage, short take-off and landing and good flying qualities make his aeroplane the ideal Dakota replacement—particularly for colonial work. Arguments against it are the cumbersome size of the wing, which is too large for most hangars, and the possible high cost of manufacture, both in man-hours and in material. Of the projected H.D.45 jet transport the writer feels very doubtful; but another scheme for a 60-tonne A.S.R. aircraft with a Bréguet Deux Ponts fuselage seems much more practical. With Nomads or Turbo-Cyclones the project envisages a maximum endurance of 75 hours! To achieve this startling figure, cruising would be done on 20 per cent flap, taking only 400 h.p. from each engine and flying slowly.

In passing, Cmdt. Hurel expressed decided views on two subjects which seemed applicable to his design. He does not consider bonding in place of rivets for his wing because of repair problems in out-of-the-way places. He feels that the complications and weight of providing boundary-layer suction would outweigh the structural advantages of the thick Griffiths aerofoils.

A very interesting transport, to be shown in model form, is the S.E. 210 Caravelle, from the Toulouse factory of the S.N.C.A.S.E. This aeroplane is, at first sight, a startling break with accepted pure-jet transport ideas. In the first place, it is for medium stages up to 1,000 miles, over which turboprops are generally considered to be more economical. Secondly, the engines are carried in stubby pods at the rear of the fuselage.

Pierre Satre, chief engineer at Toulouse-Blagnac, explained that he chose turbojets because there were, in his view, unlikely to be any fully developed turboprops of the power he wanted available in 1955, when the aeroplane was due to fly. The stage-length was set by the *Secretariat Generale a l'Aviation Civile et Commerciale* specification, which was based on French colonial requirements, particularly for the Paris-Algiers route, where traffic is becoming very heavy. Design of the Caravelle was not, however, stabilized until Jaques Lecarme (formerly chief test pilot and now overall chief engineer of S.N.C.A.S.E.) had made a tour of overseas operators, particularly in the U.S.A., where both short and long haul companies were sounded about their views and requirements.

Technical background comes from the Armagnac and the Grognard, the lessons from which are quite evident in the Caravelle. The clean wing and leading-edge flaps of the latter proved so successful that this was made the basis for the new design. This was to ensure minimum drag at high speed and a high lift-coefficient accompanied by a smooth symmetrical stall. It also simplifies the design of a stiff structure and gives a good clear space for tanks. Having taken this approach, the next step was to consider the loading requirements. The North African traffic is both very mixed and seasonal, so that the specification called for adaptable freighter/tourist accommodation. This meant a parallel tubular fuselage with a movable front cabin-wall, folding seats (9g forward- or rearward-facing, on rails) and a freight door. Then, making the load straddle the c.g. left little alternative to putting the engines at the rear, particularly as a short undercarriage for easy refuelling and loading precluded the use of underwing "vacuum-cleaner" pods.

The fuselage is the same diameter as the Comet and, because of this, a unique example of Anglo-French co-operation has been possible. The entire cockpit assembly and nose is being bought from de Havillands. M. Satre says that this will not only save design and tooling costs, but, since it is an installation accepted to I.C.A.O. standards and in use with Air France and U.A.T., much unnecessary discussion can be avoided! Passenger accommodation is for 70, in 14 rows of five, and capacity payload is nine tonnes. Freight is loaded through a large door forward, and passengers enter by an integral companionway under the tail. The curious triangular windows give the maximum downward view for the minimum amount of transparent material—which saves a considerable amount of weight in 28 double-skinned windows.

Arguments put forth in favour of the engine installation are: accessibility, easy removal, reduced fire-risk because of distance from tanks, low risk of structural damage from blade failure, high ground clearance from stones and grit, minimum cabin-noise level, and small yawing moment with engine failure. The engines at present envisaged are Rolls-Royce Avon RA 16s of 10,000 lb s.t.

Any other axial in this power class can be installed with little modification, as the c.g. range allows for engine weights between 2,850 lb and 5,060 lb.

Work on the fuselage jigs and some of the first parts of the fuselages of the two prototypes is well advanced at Toulouse. Jigging is being done on a full production basis, since the design has no competitors—although it has potential foes in possible state economies.

Preliminary data for the Caravel are: span 112ft 6in, length 103ft 4in, height 29ft 4in, wing area 1,577 sq ft, wing section N.A.C.A. 65_1 212, sweepback 20 deg at 25 per cent chord line, dihedral 3 deg, aspect ratio 8.02. Cabin dimensions are: internal diameter 118.4in, floor width 109.9in, height at gangway 80.6in, length 44ft 4in. Estimated weights are: tare 39,600 lb, normal gross 85,800 lb, specification payload 15,440 lb, capacity payload 20,950 lb. Estimated cruising speed is 457 m.p.h. at 33,000-43,000ft.

The S.N.C.A.S.O. intends demonstrating the S.O.-9000, the Trident. This dangerous-looking aeroplane is the latest in a series of high-speed types, of which the Espadon, SO-MI and SO-4000 may be remembered. The Trident seems to have a modified Espadon fuselage which acts mainly as a fuel tank for the SERP rocket motor in the tail and the Marborés in the wingtips. A very thin, straight, parallel-chord wing is used to obtain reasonable handling characteristics at what must be a very high stalling speed because of the small span. The angular tail controls, both elevator and rudder are in one piece without fixed surfaces, and are power-operated. The reason for the anhedral elevator is obscure, since with the narrow track undercarriage the tips must be in danger from the ground. The Trident has flown and it is, in fact, no more freakish than other supersonic designs, such as the Bells.

Another supersonic design, this time in full-scale glider model form, is the S.F.E.C.M.A.S. Ars 13-01. This model has done a lot of flying to prove the aerodynamic configuration and control responses of the future powered aircraft. It is a delta wing with a large fin, adjustable tail plane, and a bicycle undercarriage—which is fixed on the model. The pointed nose and blunt tail suggest that a rocket motor is envisaged.

René Leduc's latest ramjet, the O21, is expected to be at Le Bourget. This determined engineer has been plodding on with his futuristic-looking aeroplanes since 1938. The new model, unlike the research 010 prototypes, is armed as an operational fighter, yet with its transparent cockpit cone it looks far more freakish than the purely experimental ones. A bicycle-type undercarriage is now fitted and fairings at the wingtips are intended eventually to be replaced by two Marborés for take-off and cruising. The pilot is prone, not so much as an anti-g precaution as to reduce his frontal area. The O21 is subsonic, but a climb to 32,000ft in 2 min has been claimed with a full-power endurance at that height of 15 min.

Helicopters

The curious Cantineau helicopter, with its motor mounted above the pilot, will be shown under the Spanish flag. Although it had not many hours of flight behind it, this aircraft was much admired and, since it could be built for a fraction of the price of the comparable Hiller, arrangements were in hand last winter for series manufacture by a French nationalized company. Unfortunately, disagreements arose over methods and percentages, with the result that a dissatisfied M. Cantineau betook himself to Spain—with his aircraft *and* his patents.

The S.N.C.A.S.E. has its S.E. 3101 "agricultural instrument" to show, which has recently completed an endurance trial of 100 hours in a fortnight. In its latest form there is accommodation for four stretcher cases.

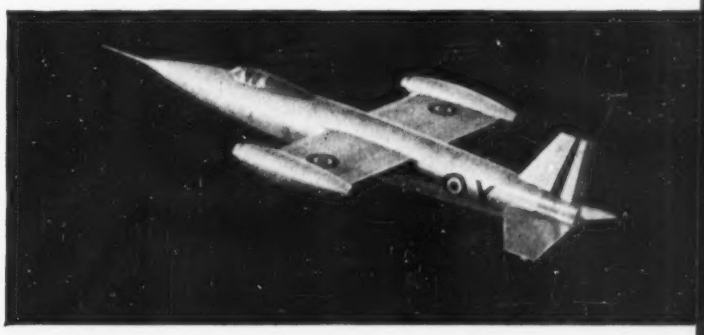
S.F.E.C.M.A.S. Ars. 13-01 glider—a full-scale model of a supersonic delta.

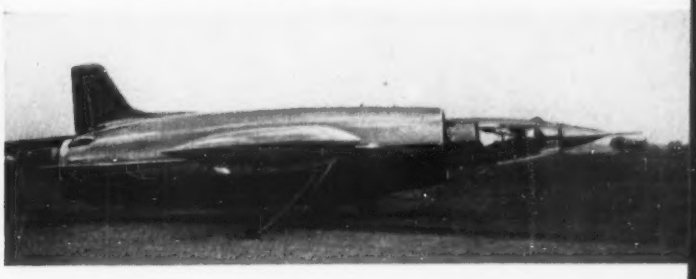
Most interesting of the rotary-wing aircraft are the S.N.C.A.S.O. fairies, the Ariel III, the Djinn, and the Farfadet. The first was flown at Le Bourget in 1951 and proved that jet-driven rotors can be excruciatingly noisy. Even French eardrums appreciated the likely objections to this for city centre heliports and the S.O.-1220 Djinn was the result. This is a purely experimental single-seater with a Turboméca Palouste supplying compressed air to the rotor tips. The makers claim that without combustion the jet drive is practically noiseless. It is also claimed that fuel consumption is less than a third of that of a similar helicopter with jet-driven rotors.

The Djinn is a purely experimental model to test the rotor drive for the Farfadet convertiplane. Even so, the Farfadet (S.O. 1310) as a three-seater with both a 360 h.p. Artouste II compressor turbine and a 360 h p. Arrius II airscrew-turbine must itself be considered to be experimental and is manifestly a modified Ariel III. The Farfadet has been flying at Villacoublay since May 8 as a helicopter, since its Arrius had not been delivered by the middle of June.

It is claimed that the Farfadet takes off as a helicopter and then, when the airscrew-turbine takes over for propulsion, the compressor is stopped and the rotor continues in autorotation—a similar principle to the first, and unsuccessful, Ariel exhibited in 1946. With the convertiplane, however, the wing contributes considerable lift and it does not fly as an autogiro. The burning question is the weight penalty of carrying an idle engine—even such a light one as a Turboméca—in either form of flight. Ideally, one engine should be adaptable to function as a compressor or for propulsion.

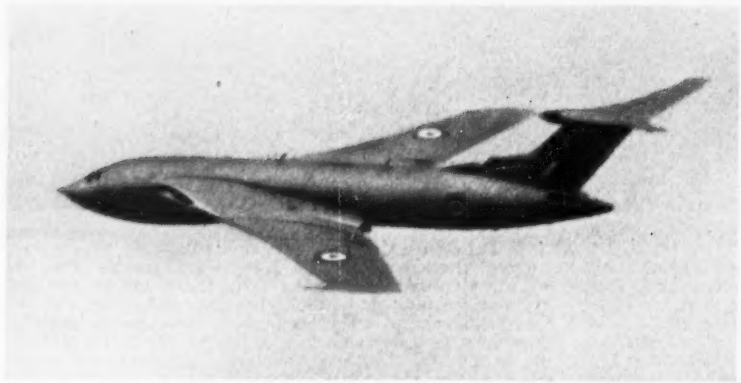
The Farfadet carries a pilot and two passengers for 250 miles at a cruising speed of 150 m.p.h. The rotor diameter is 36ft 6in, and the fixed wing has a span of 19ft. Whatever one may feel about its future, the Farfadet is the first true convertiplane to fly and its designer, M. Morain, and the S.N.C.A.S.O. are to be congratulated on the results of their many years of effort.





(Above) S.O. 9000 Trident, with rocket-cum-turbojet power. (Left) S.E. 3120 Alouette, which has more than 300 hours' flying to its credit. (Below) The ramjet-propelled Leduc 0.21.

AIRCRAFT INTELLIGENCE



UNOFFICIAL APPEARANCE of the H.P. Victor prototype (WB771) in the vicinity of the Royal Aeronautical Society's Garden Party on June 14th. No official pictures of this four-Sapphire "V"-bomber, other than the long-stale ground views, have yet been released.

Great Britain

New Turbojets. Recently mentioned in a number of journals is the de Havilland Gyron. According to *American Aviation*, the unit is designed for a maximum static thrust of 20,000 lb and has been running since January at about 16,000 lb. The report goes on: "The Gyron uses a seven-stage, single-spool compressor of titanium construction." The same publication states: "Bristol Aeroplane Company has abandoned work on the Satin [*sic*] engine . . . in a general re-evaluation of development activities, even though some 50 engines were under way."

*D.H.*110. Last week, in our leading article, reference was made to the possible adoption of the D.H.110 by the Fleet Air Arm. The Ministry of Supply now confirm that they are carrying on a development programme with the 110 as a high-speed research vehicle, but no further information is forthcoming regarding the Admiralty's interests in the 110 or a development.

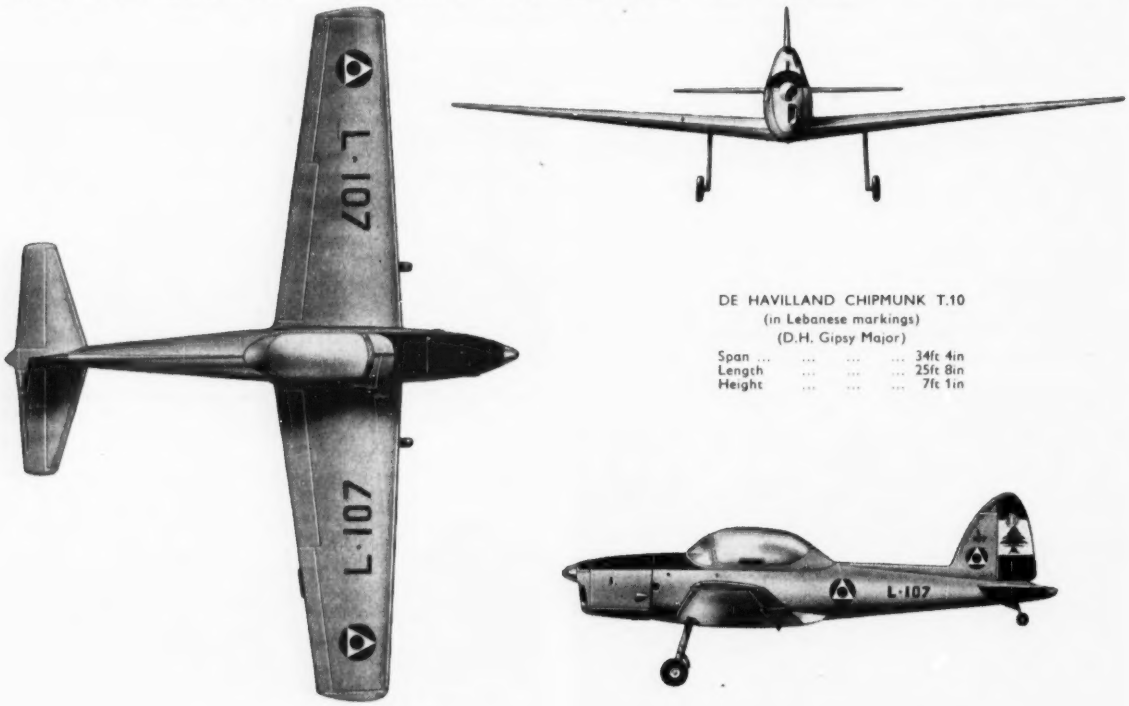
France

Types at the Aeronautical Salon. The following list of French aircraft which will probably, or possibly, be displayed at the Salon—in flight and/or statically—is the most complete available at the time of going to press (a technical appraisal of certain of these types appears on pages 811-815): *S.N.C.A.S.E.:* S.E.3101, S-55, Armagnac, two Grognards, Mistral, Sea Venom, Le Baroudeur (doubtful); *S.N.C.A.N.:* Noratlas civil freight/passenger version, N.C.856; *S.N.C.A.S.O.:* S.O.30, with flush-intake Palas take-off boosters, S.O.30 Atar, Djinn, Vautour, Trident, S.O.6025, Farfadet; *S.F.E.C.M.A.S.* (*Arsenal*): Ars.5301, Ars.1301 (S.600 ramjet may be demonstrated on Ju 88), VG.90-30 (doubtful); *Béarn:* Minicab; *Boisavia:* Mercurey, Anjou; *Breguet:* Deux Ponts, Vultur; *Brochet:* M.B.100; *Dassault:* Flamant (315, 311, 312), Mystère IV, production Ouragan and/or M.D.453; *Fouga:* C.M.170, C.M.8R-8.3 (C.M.101, with Piménés in nacelles, doubtful), Gemeaux, and probably a sailplane; *Hurel-Dubois:* H.D.31; *Jodel:* Bébé, D.II and/or D.III; *Leduc:* 0.10, 0.21; *Max Holste:* M.H.152; *Morane Saulnier:* M.S.733, M.S.755 or M.S.700 (one of this series is almost certain), M.S.479; *Rey:* R.1; *S.C.A.N.:* S.C.A.N.30 (doubtful); *S.E.V.I.M.I.A.:* Emouchet with Escopettes; *S.I.P.A.:* 901, 200, 200-02, S.12 (possible); *Farman:* Monitor; *Potez:* Potez 75.

India

Home-built and Imported Aircraft. It is learned that the first Indian-designed and developed all-metal basic trainer, the HT-2, will go into full production before the end of the year at the Hindustan Aircraft factory, Bangalore. The type has been developed for the Indian Air Force and will be offered on the world market. Six machines of the type have already been delivered and five more are being assembled. Powered by a Blackburn Cirrus Major, the HT-2 is cleared for all aerobatics at a gross weight of 2,240 lb. Hindustan Aircraft also plan to produce a prototype of the HT-10 advanced trainer and a mock-up is already in existence. This type is likewise intended for the Indian Air Force and will be powered by a 1,200 h.p. engine.

Another news item from India concerns the probable acquisition of French Ouragans. This is in keeping with the Indian Government's policy of "diversifying" her sources of defence supplies, and negotiations for the purchase of a large number of Ouragans (as many as 70) are almost complete.



DE HAVILLAND CHIPMUNK T.10
(in Lebanese markings)
(D.H. Gipsy Major)

Span	34ft 4in
Length	25ft 8in
Height	7ft 1in

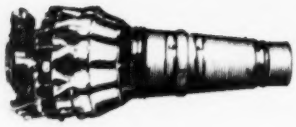
ANTI-SUBMARINE

For service in the Royal Navy—Fairey Gannets will operate from Fleet and Light Fleet Carriers. The Gannet is the latest specialised anti-submarine aircraft produced in Britain.

FAIREY GANNET

FAIREY AVIATION

THE FAIREY AVIATION COMPANY LIMITED · HAYES · MIDDLESEX



GHOST

A quarter million miles between overhauls

DE HAVILLAND ENGINES

DH
ENGINES

THE SHARP END

Britain and Australia in the Korean War . . . 2

By H. F. KING, M.B.E.

Gloster Meteor 8s of No. 77 Squadron, R.A.A.F., head out for a last-light road recce.

THIS, the second instalment of an account of R.A.F. and R.A.A.F. activities in the Far East and Korea, draws an intimate picture of the life and operational activities of the illustrious No. 77 Squadron, Royal Australian Air Force. Since it was written, certain changes in personnel—notably the taking-over of command by W/C. A. Hodges, A.F.C.—have taken place; the substance of the article, however, remains unaffected. A third article will conclude this series.

"FLIGHT" PHOTOGRAPHS By L. W. McLaren

SOGGILY we heaved ourselves aboard Dakota A65-93 of No. 30 Transport Unit, to find as our companions two dozen Australian soldiers in slouch hats and long, wet greatcoats. They were lately out of the line and once the Dak. was airborne they began to nod on each other's shoulders—like so many babes in the wood, I thought (though I should have thought again before saying so to their faces). I watched the youngest polish off three apples before he sagged sideways; then, while he was still evidently asleep, another apple magically appeared in his hand, to be instantly dispatched, and followed by a fifth. I am sure there was an invisible cornucopia somewhere on that Dak., but I was unable to check because F/L. G. H. Stewart, D.F.C., kindly invited me to go forward.

For the best part of three hours we flew Item Fox Roger along airway Green 10, and, as the hail punished the paintwork, F/L. Stewart told me how he had flown a Viking and Bristol Freighters over the Woomera range. Quite unexpectedly he was able to call "Cancelling Item Fox this time" as we approached Haneda; and so we landed, in the dusk of a dismal evening, without recourse to the American G.C.A.

The business of getting finger-printed and photographed, and of drawing winter clothing, allowed us little acquaintanceship with Tokyo; but our parkas, with their manifold substrata, were most warmly appreciated at 4 o'clock on the morning of our departure. Though forced to stop and scrape ice from the screen, our Japanese driver had us out at Tachikawa in time to join a Korea-bound C-54 of a Combat Cargo Air Division. As day broke we made out the gargantuan shapes of Globemaster IIs, their maws agape for a breakfast of troops.

The Korean airstrip which was the Skymaster's first stop was four hours distant, and for that period we sat like wallflowers, with cargo massed at our feet. On the quartermaster's invitation (he toted a red-and-white-handled .45 in an armpit holster), we made our way aft to draw a paper-cupful of coffee from the urn provided. Our neighbour—a colonel of anti-aircraft—proffered gum and Luckies; and there was snow-flanked Fujiyama to marvel at, though distantly.

When we landed at the strip the G.I. passengers filled their water-bottles from a converted F-80 tip tank, trestled up in the air traffic hut, and I myself basked in the pale sunshine watching the aeroplanes. Smallest, but by far the most numerous, among these were the gaudy Thunderjets of two fighter/bomber wings. They stood on the far side of the strip, shining among the drab dumps of tanks and bombs, the huts and tents, with brown snow-flecked mountains rising beyond them. Dominant on the field were the C-124s, which shook me to the marrow as they bore down the runway like juggernauts; and complementary to the usual Packets, Dakotas, Commandos, Beeches and Harvards, there was a solitary T-33, busy with circuits and bumps. As I watched, two Commandos came in with battle casualties. The men on the stretchers lay quite still, heedless of the bustle around them.

Our Skymaster was held at the runway end to allow pairs of F-84s to depart in a continuous stream, laden with 1,000-lb demolition bombs, 100-lb "frags" and wing-tip drop-tanks.

We flew for an hour over mangy brown mountains and muddy, icy rivers, and put down at a crowded forward base, where I added Bird Dogs, Beavers and Albatrosses to my tally of sightings. I humped my kitbag to a jeep, slumped in beside F/L. Ross Alexander, and we went bumping and jumping towards the base of 77 Squadron.

This proved to be a vast, hill-fringed agglomeration of dust and mud (for the thaw was setting in), of P.S.P. planking, sandbags, rocket dumps, dug-outs, cables, tents, huts, aeroplanes, revetments, and flak emplacements. Garish notices identified or advertised units, and cautioned jeep-drivers. I made my number with the Commanding Officer, W/C. John Hubble, A.F.C., R.A.A.F., and having appointed a later meeting, set about investigating the Meteor dispersals.

I saw that the aircraft had the standard silver finish, but differed from those of Fighter Command in having a radio compass (the loop fairing for which is prominent on top of the fuselage), zero-length rocket attachments, and boldly inscribed individual names.

The flying was incessant. Flashily marked Sabres screamed balefully northwards to the Yalu; RF-80s came whistling in from photographic sorties; and Meteors nosed out from their revetments to go scurrying round the taxi-track, blasting up the red dust. One Sabre, with compressor surge, landed very "hot" but came safely to rest at the far end of the runway. A B-26 disappeared beyond the hills and a pillar of smoke ascended. A helicopter whirred towards it.

It was nearly time for the briefing of Meteor pilots for a last-light road recce. The sun was fast going down and the cold penetrating deeper under my parka as I stood outside the ops. hut with Major McFall, U.S.A.F. The major is Base Weather Officer, and he makes no secret of his affection for 77; they, for their part, have made him an honorary—the only honorary—member of the mess.

The best of the weather, he told me, was just ending (it was late February), and a poor, transitional period between this and the summer monsoon was setting in. With its cumulus build-up, the summer itself would be poorer still—especially for the precision fighter/bomber strikes.

In his briefings the major gave first consideration to the safety of the aircraft; second to the target weather. His prognostications owed much to the weather-recce. aircraft, which might be Meteors, Sabres, Invaders, Superfortresses, Sunderlands or Mariners, depending on the type of mission. There was no difference, he assured me, between briefing the Australian squadron and his

(Top) American troops emplaning on a Fairchild Packet of the U.S.A.F. at an advanced Korean base. Below it are seen, respectively, a U.S.A.F. C-54 Skymaster, C-46 Commando and C-47 Dakota, all of which are doing splendid work in Korea.

On the left is a Douglas C-124 Globemaster II; on the right a Lockheed T-33 trainer. The Globemaster has tip-mounted combustion heaters; the T-33 has similarly disposed tanks.

THE SHARP END . . .

own compatriots; and there was no doubting his sincerity when he described the set-up at this base as a remarkable example of the integration of United Nations forces.

I was watching four Meteors, each with a pair of H.E. rockets, flying out over the long hill-shadows for their last-light recce. when an Australian voice said, "They work like tigers—start at 5 and keep going till 8 or 11 at night" . . . It was F/L. Taylor, the operations officer. A few minutes before he had been briefing the pilots to attack locomotives, box-cars and transport vehicles. He had enjoined them not to descend below 8,000ft unless committed to attack and had warned them to look out for Panthers working in the same area.

After a token wash from a jerrycan, by candlelight, I was taken along to the U.S.A.F. mess hut where, cafeteria style, I fared astonishingly well in company with the RF-80 and RB-26 pilots who take those amazing close-ups of enemy dams and bridges. Then I was conducted through the blackness to the hut where 77 Squadron Aircrew Club is nightly in session.

I think every pilot was there, each with his blue earthenware mug, emblazoned with helmeted kangaroo and straffing Meteor; and once the functional, as well as the decorative, merits of the mugs had been duly demonstrated, we fell to talking 77 to the dozen. This is what I learned about "the squadron which has never been home."

Formed in 1942, it flew its Kittyhawks from Darwin against the Japanese massed on the threshold of Australia. Came Mustangs, and bases now dimly remembered in Britain—Goodenough, Kiriwina, Neomfoor, Moratai, Labuan; then Southern Japan, "for occupational duties."

In June, 1950, with the return home close at hand, the Korean war broke on the world, and the squadron went into action with American troops. It was the first non-American unit of any kind to do so, and it fought with Australian doggedness and valour. Three times it changed its base before being recalled to Japan in April, 1951, for re-equipment with Gloster Meteor 8s.

In July it returned to Korea and before the month was out its Meteors—in the words of one of the squadron songs—were "flying down the Yalu." August saw several inconclusive brushes with Mig-15s, but it was not until the 29th of that month that the first decisive action was fought—between eight Meteors and 30 plus Migs. One Meteor was lost and two damaged.

Later actions, in which three Migs were destroyed, one claimed probable and one damaged, showed the calibre of the 77 Squadron pilots; but they showed also that the Meteor was much inferior in fighting performance to the swept-wing, Nene-powered Mig. This came as no surprise to those with a rudimentary knowledge of fighter design, but, the Meteor pilots having been called upon to sign an undertaking not to discuss the relative merits of the two machines, the Australian public was slow to realize it.

In January last year the primary role of the squadron was changed from air combat to ground attack, and in this work a singular success is being achieved. Thus, in February this year (the C.O. quoted the figures from memory) the Meteors destroyed over 150 trucks, four locomotives, 15 box-cars, and a quantity of supplies. And "destroyed" means a "flamer," or a secondary explosion.

The tasks undertaken by 77 Squadron are road reconnaissance, bomber escort, rocket strikes, "rescap" for downed pilots, standbys for attacks on airfield and—in case of large vehicle sightings—"vehicle alerts."

A U.S.A.F. Globemaster is shown above. On the left is an identification board typical of those seen at American airfields in Korea. (Below) An F-84 fighter/bomber and North American T-6.

The armed road recces. are flown as required, but usually at first and last light, and the Meteors operate in pairs. Common targets are trucks, locomotives, box-cars, vehicle revetments and supply dumps. Munitions carried are 800 rounds of 20 mm ammunition and two 60 lb R.P.s—the latter for trains or similarly deserving targets. For use against thin-skinned transport the Meteor's 4 x 20 mm gun armament appears to be as effective as anything. The attacking aircraft fly above the trajectory of light flak and automatic weapons (and below the most effective height of the "heavies") until the target is sighted. Then—as the Communists know well, for they have seen it often enough—they enter a 30 deg dive, weaving to discourage flak until the pilot has to line up on the target and open fire. A full-bore breakaway is indicated, and here the Meteor's excellent rate of climb and unusually quick acceleration are truly appreciated.

The task of the road-recce. pilot is rendered exceedingly difficult in Korea by the high standard of enemy camouflage, and by the enemy's infrequent use of the roads by day. The Communists are up to every camouflage trick in the book; they cover heaps of rocks to make them appear as vehicles and hide the vehicles themselves in gulleys, ravines and villages, even knocking down the walls of huts to drive vehicles in. Rarely are more than 20 vehicles spotted at a time.

On these low-level expeditions the pilot must keep an extra sharp eye on his fuel gauges. Even so, it is quite usual for Meteors to land with the minimum fuel necessary.

The bombers which it may fall to the squadron's lot to escort are B-26 Invaders, and their designated targets lie from the battle front all the way to the Yalu—rail bridges, troop and vehicle concentrations, and airfields, such as Wonsan and Sinmak. In a typical sortie Meteors would be engaged for close escort and to provide a fighter screen. This screen would sweep backwards and forwards north of the bombers (i.e., in the direction of the Migs), and the close escort would be maintained until the bombers were safely out to sea. At the same time the fighter screen would gradually withdraw.

Targets for rocket strikes are, among others, villages known to be harbouring troops or vehicles, and bridges. Eight or 16 R.P.s are the prescribed external stores (the number depending upon the size of target) and the Meteors attack in trail. The pilots take appropriate evasive action in the dive and on the breakaway.

Though the U.S.A.F. can be counted on for first-rate photographic coverage, the targets themselves are often difficult to locate. Light flak can be expected, and small-arms fire—from troops in slit trenches using machine guns and automatic rifles—is frequent, and often intense.

"Rescap" is generally undertaken at short notice and four Meteors are normally detailed. Their job is to provide cover for the rescuing helicopter and to shoot up any enemy troops who might be molesting it. When extra large fighter/bomber operations are mounted, special combat air-patrols are maintained for "rescap" duties.

Dawn and dusk being the favourite times for low-flying attacks on airfields, the squadron must maintain stand-bys at these periods. The aircraft thus committed have, in fact, been scrambled to intercept unidentified aircraft approaching from the north—as well as to provide "rescap."

"Vehicle alert" demands four aircraft at readiness (5 min airborne) and four backers-up (10-15 min airborne), and the task is to attack any large vehicle sightings or trains, reported either by previous Meteor sorties, or by U.S.A.F. tactical reconnaissance.

Close support of ground troops is given by Meteors operating under the control of a "mosquito" T-6, L-19 or L-20. The targets might be tanks, artillery, or especially stubborn enemy strongpoints. Camouflage, again, is a most serious problem; heavy guns, for instance, may be hidden in caves, hauled out for firing, and hauled back to safety.

The views expressed by F/L. Babst concerning the Meteor were fully endorsed by his brother officers; and in discussion with them several other points emerged—mostly to the Meteor's credit. "Amazing" was the C.O.'s description of its serviceability record—and while a single machine is u/s the ground staff does not stop work. The spring-tab ailerons, the pilots find, give increased manœuvrability in the dive, and the enlarged intakes for the Derwent improve the fuel consumption. The 77 Sqn. Derwents run on American JP-4 fuel and their long life and general simplicity are factors highly valued in Korea. There are no night-flying problems with the Meteor, though the pilots agree that they could "use a bit more range." It is not unknown for a Meteor to return from a sortie with one engine shut down to conserve fuel.

South Korean troops disembark casualties from a C-46 Commando.

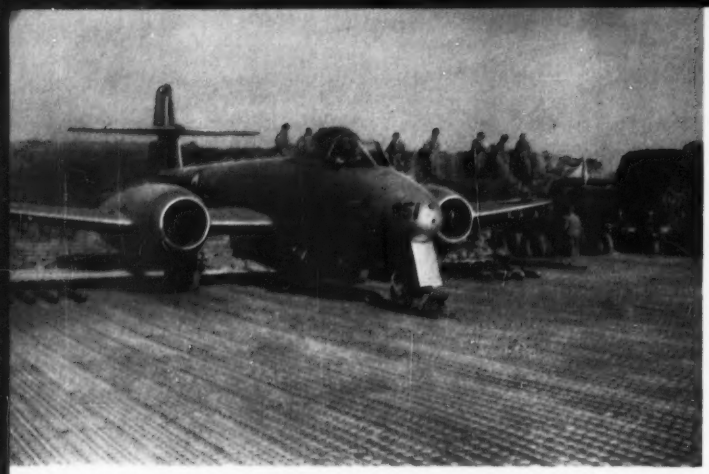
With their low gravity-drop and potent H.E. and S.A.P. ammunition the 20 mm guns are considered by the wing commander to be "mighty weapons." Being set in the fuselage sides, they are easy to maintain. The famous napalm rockets, invented by F/L. J. C. Smith, a former 77 Squadron armament officer, are still stocked, but the standard H.E. type is better suited to current operations. When the pylon-type bomb carriers—seen at Farnborough three years ago—become available, it may be expected that the squadron will undertake dive-bombing as an additional commitment.

Like all external tanks, the 175-gal ventral tank is vulnerable, especially in low attacks, and is jettisoned as soon as possible in action. The air brakes are invaluable for diving attacks.

At the time of our call the snow covers, made for the Meteors by the U.S.A.F. parachute section, were in use. These saved brushing the snow off each morning, and were supplemented by the ordinary engine and cockpit covers. The cold weather, in fact, affected the Meteors less than their maintenance crews, whose fingers became frozen after five or ten minutes' work in the winter. The bitter wind would sometimes rise powerfully, and the men would brave it out in their long underwear, string vests, woollen shirts, combat smocks and trousers, and fleece-lined British parkas.

Flying rig, when I was out there, was generally a U.S.A.F. Mk 4 immersion suit, with an R.A.F. (Mk 3) or U.S.A.F. Mae West and U.S.A.F. P.1 (Lombard) helmet. The boots of the suit are welded on and the occupant enters "through the chest." A Kapok-lined inner was available, but some pilots were wearing ordinary winter clothing with two sweaters, as was F/L. Price

Pilots of No. 77 Squadron, R.A.A.F.: (left to right) F/L. M. Whitworth-Jones, R.A.F.; P/O. Ken Murray, D.F.M., R.A.A.F.; F/O. A. J. Rosser, R.A.F.; F/O. D. A. Arnott, R.A.F.; S/L. T. Tonkin, R.A.A.F.; F/L. V. Shearn, R.A.A.F.; F/L. V. Hill, R.A.A.F.; F/O. D. Wittmann, D.F.C., R.A.A.F. A number of these officers have now completed their operational tours.



A Gloster Meteor of No. 77 Squadron, with U.S.A.F. personnel building up the revetment. Rocket projectiles lie ready beneath the wings.

With W/C. John Hubble, A.F.C., O.C. No. 77 Squadron (centre), are (left) S/L. D. Hillier (officer i/c flying) and S/L. R. Glassop, D.F.C., who took over S/L. Hillier's duties shortly after our visit.

The metal R.P. boxes seen above make serviceable pavements at No. 77 Squadron's Korean base. (Below, left) F/L. G. Galbraith, M.O. of No. 77 Squadron, confers with W/C. D. A. S. Morgan, S.M.O. of No. 91 (Composite) Wing, R.A.A.F. The adjacent picture shows a Meteor nacelle which sustained a direct hit from a 37 mm shell.

Meteor 8s of No. 77 Squadron, R.A.A.F., with P/O. Ken Murray's aircraft —"Black Murray"—in the foreground.

THE SHARP END . . .

when we met him on the airfield. He showed us the valves on the boots which had to be sealed on entering the water, the blanked-off provision for a G-suit, and the numerous pockets. He considered the suit an excellent garment (after initial discomfort) but disliked the P.1 helmet because it restricted his vision and bumped on the canopy. His preference was an ordinary R.A.F. leather helmet.

Many of the squadron pilots preferred the American Mae West to the British pattern, and there were numerous variations in rig, according to personal taste. The C.O. himself favoured the P.1 helmet and considered that it would certainly be needed in the bumpy hot weather. He recommended all pilots to carry a knife as well as a revolver, and would himself prefer it to the revolver for survival. Not only was it useful for cutting oneself free, but for piercing the dinghy (should it inflate in the air), for getting food, and for building a shelter.

Finding the waist holsters too bulky, many of the pilots were wearing armpit holsters, which they bought in Japan for about 350 yen. Some had had them adapted to take the knife also. A flashlight was considered an essential item of flying equipment.

As for flying conditions, the ruggedness of the Korean terrain can be judged from McLaren's pictures. The physical difficulty of making dive attacks in the valleys (and, what is equally important, getting out afterwards) will be obvious enough. Nor are these the only handicaps, for a pilot newly returned from a sortie told me that an attack on vehicles had been seriously interfered with by turbulence. The rivers, of course, are a useful navigational aid, but otherwise there is little to be said for flying in Korea.

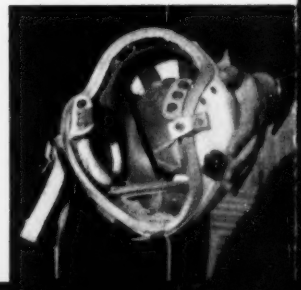
Of these matters I talked with the 6ft 3in, 15-stone W/C. Hubble and his officers. That afternoon the wing commander had been leading an escort for B-26s Wonsan-way. I heard that he had flown more than 65 sorties since he took over the squadron from S/L. J. R. Kinninmont, D.F.C., late in 1952, and he told me he was trying to get in one a day. He described the current operations as "a battle of camouflage and flak versus the air."

Physically contrasting with him was his opponent at darts—P/O. Ken Murray, D.F.M.—who chalked up sorties with the same frequency as double-tops. Black Murray held the record for the squadron—and possibly for the theatre—for jet combat sorties. That day he had completed his 330th—beating F/L. Wally Rivers by 11. Murray had only lately been commissioned, though he was nearing the end of his second operational tour and had applied for a third. The wing commander assured me that his aggressive spirit and experience on jets had proved most valuable to the squadron.

F/O. Dick Wittman, D.F.C. (227 sorties), had completed his second tour (and a two-month extension of operational duties), and had been made responsible for testing and instructing at Iwakuni. He had converted 50 replacement pilots on to Meteors.

Sharing the stove with their Australian tent-mates were five attached R.A.F. pilots—F/L.s M. E. Whitworth-Jones and

(Left) F/O. J. W. Price, R.A.F. (attached to No. 77 Squadron, R.A.A.F.), in full Korean winter-fighting regalia. Shown below is the P.1 helmet as used by pilots of No. 77 Squadron.



FACTS ABOUT THE GLOSTER JAVELIN / *Super Priority for the R.A.F.*

Rate of Climb

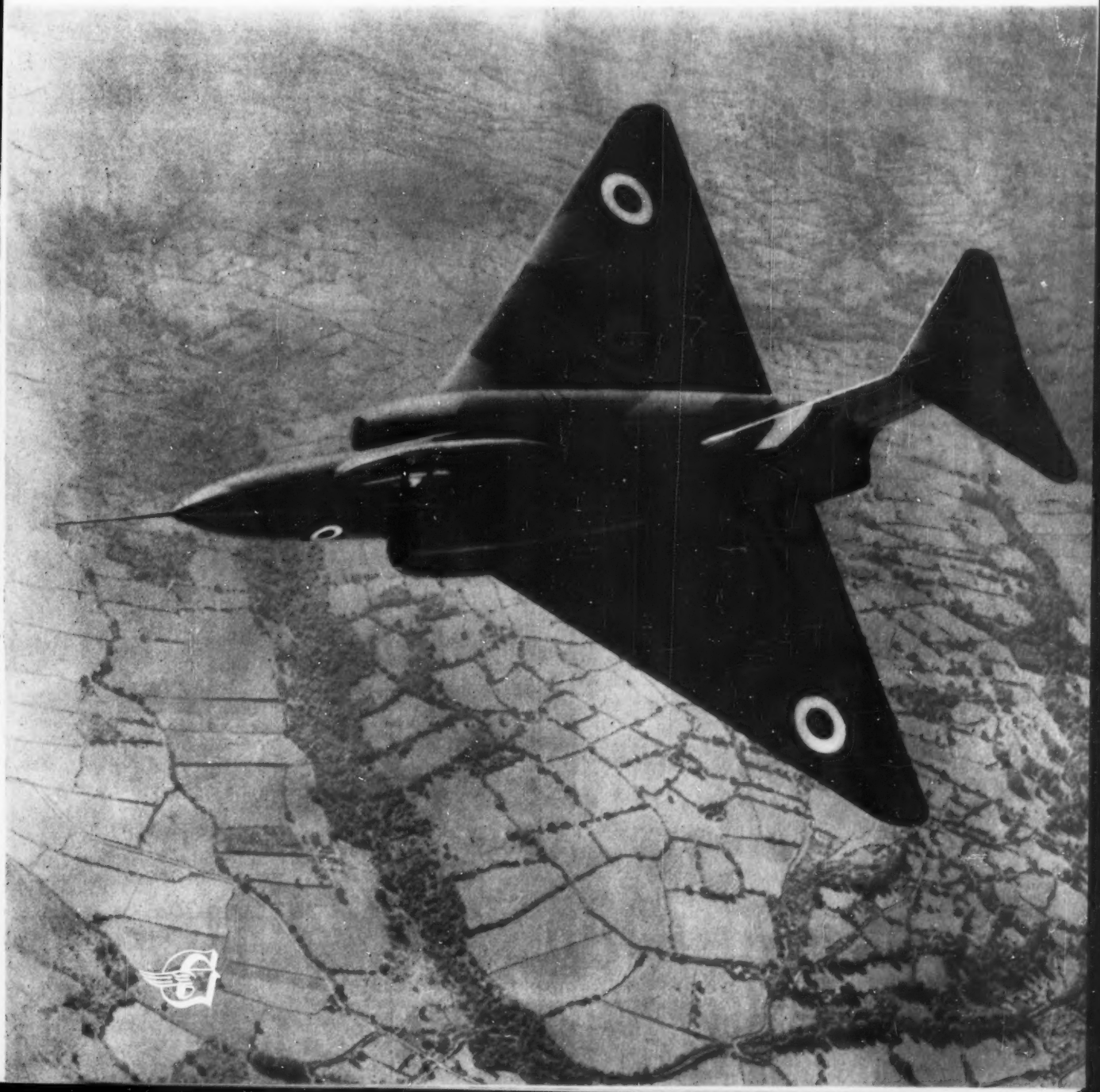
Time to combat altitude is a vital factor in a fighter's performance. With the characteristic low wing loading of the Delta Planform and an excellent power/weight ratio, the rate and speed of climb of the Gloster Javelin are phenomenal . . . enabling it to reach altitude quickly with more fuel for increased endurance and combat action.

Gloster Aircraft Co. Ltd.

Hucclecote / Glos.

PARIS AIR SHOW—*Be sure to visit Stand No. 21*

MEMBER OF THE HAWKER SIDDELEY GROUP / PIONEER...AND WORLD LEADER IN AVIATION.



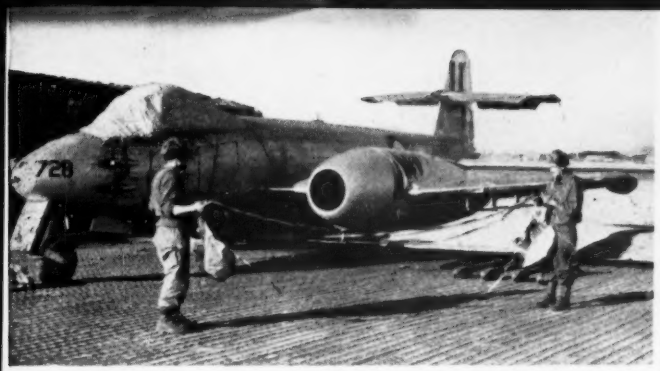
The name that's abroad in the air

AIRWORK'S FAME at home and abroad is spreading far beyond the limits of aviation circles. Undoubtedly Airwork's share in the first private enterprise airline, the highly successful SAFARI (Colonial Coach Class) Service, has done a lot to establish its growing prestige with the travelling public.

AIRWORK AIR TRANSPORT DIVISION

AIRWORK LIMITED · CHESTERFIELD STREET · LONDON · W.1

Also at : Blackbushe Airport, Nr. Camberley, Surrey. Booker Aerodrome, Marlow, Bucks. Gatwick Airport, Horley, Surrey. Hurn Airport, Christchurch, Hants. Langley Aerodrome, Bucks. Loughboro' Aerodrome, Dishley, Leics. Perth Aerodrome, Perthshire. Royal Naval Air Station, St. Davids, Pembs. Speke Aerodrome, Liverpool. Usworth Aerodrome, Castletown, Co. Durham.



The left-hand photograph shows ground-crew of No. 77 Squadron tucking up one of their Meteor 8s for the night. On the right, L.A/C.s Glen and André reveal a stock of H.E. rockets for our camera. (Below) A light flak emplacement at an advanced Korean base.

J. W. Price, and F/O.s J. A. Rosser, D. A. Arnott and B. M. Burley. Babst (whom we had already met at Iwakuni), Rosser and Burley were from Middle East, Arnott and Price from 2nd T.A.F., and Whitworth-Jones from Fighter Command. The C.O. told me that he was very happy about them, that they fitted in well and showed aggressive spirit.

The "street" in which the pilots live has a serviceable pavement of R.P. boxes. The tents are variously identified; thus, on one door a trophy of the chase flutters silkily, and a few doors up the block the "Far Eastern Agents for the North-Rhine Westphalian Destruction Co., Ltd." proclaim themselves.

The house-pride of the occupants was a revelation. Many made their own cupboards, wardrobes, clothes driers, and even beds—and the parachute section, I gathered, could usually be persuaded to run up a pair of curtains for a chap. In the show-tent, formerly the residence of F/L.s Johnny Mellors and Martin Chandler, and occupied when I looked in by F/O.s Arnott, R.A.F., and Sugden, R.A.A.F., one found becoming lamp-shades; running-water from a Mustang fuel tank (F/L. Hill, R.A.A.F., went one better with his thermostatic hot-water system and sink); curtains; wardrobe; coffee table; and a springy bed, devised from aircraft tyres. Dak inner tubes were considered *the* thing, though F/L. Price got a good night's rest on interlaced metal strips. No paint being to hand the wood panels had been grained by blowlamp.

Electric light was laid on to each tent and a good deal of cooking went on, especially before an early sortie. The Dakotas of 30 Transport Unit brought over eggs and other tasty additives to the camp diet (140 dozen oysters from Hiroshima were not around for long) as well as regular mail—7-10 days from U.K., 4-5 from Australia. So what with the cinema; an occasional concert party; Vagabond—the American broadcasting station at Seoul; the club; two days' leave at Iwakuni every month, in addition to mid-tour leave at "Iwak." and Tokyo, the pilots managed to keep themselves amused. One or two I met were keen aero-modellers, and I saw a smooth job being done on a miniature Twin Mustang.

The pilots make a point of maintaining themselves in good voice for renderings of *Let's have a party*, which is the squadron song and dates from Mustang days ("We are the joy-boys of old Japan"); *Flying down the Yalu* ("Throw a penny on the grass and you'll be saved"); *K-9 Blues* (in the Shaibah tradition); and —very touching, this—*All I want for Christmas is my wings swept back*. Funds towards the maintenance of the vocal standard are contributed over the bar at the following rates: 100 missions, £3; promotion, £3; birthday, £3; birth, £5; night before going home, £5.

And because 77's wings are not swept back, someone clearly deserves to have his ears pinned back. With that amiable thought I ascended to an upper bunk in Whitworth-Jones' tent long after the first-light recce. detail had tucked itself in.

I supposed that recurrent gunfire in the night came from B-26s,

(*Continued on page 829*)

Korean terrain, the hazards of which are among the greatest of those faced by the pilots of No. 77 Squadron on their ground-attack sorties. This photograph was secured from an Auster of No. 1913 Light Liaison Flight. An account of the work of the Flight, and of No. 1903 Independent Air O.P. Flight, will appear next week.

A NEW CIVIL HILLER

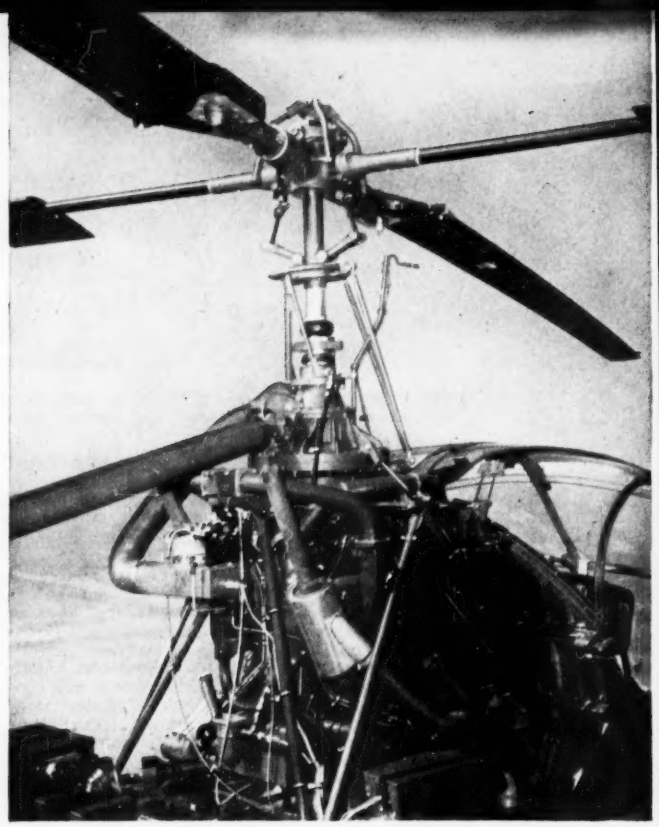
NOW that military requirements are being met to schedule, Hiller Helicopters have resumed work on production for the civil market. For the last two years orders for the U.S. Army and Navy machines, the H-23B and HTE-2 respectively, have absorbed almost the entire production capacity of the Palo Alto factory. The new commercial machine, designated UH-12B, has been developed from the H-23B and incorporates many improvements in comparison with its predecessor, the Type 360.

The 360's original 178 b.h.p. Franklin engine has been developed to give 200 b.h.p. at maximum power, and its installation in the new machine is similar to that in the H-23B. Also similar is the control layout, which includes a conventional floor-mounted control column to operate cyclic pitch (as opposed to the earlier hanging stick) and a new twist-grip throttle on the collective-pitch lever. The improved rotor head incorporates a redesigned collective ballast-weight system to reduce the load on the collective-pitch lever at various settings. This ensures that the lever needs no force to shift it, and an adjustable friction nut allows it to be set for any flight condition and then disregarded.

The other new device in the control system is fitted to the cyclic-pitch linkage behind the canopy to prevent cyclic vibrations from being transmitted to the control column. The two sprung weights, one applied to fore-and-aft control and the other to lateral, are tuned to the rotor frequency and vibrate themselves when any cyclic oscillations come back from the rotor head. The Hiller machines have always been reasonably smooth to fly and this further refinement must indeed eliminate all stick-shake completely.

The skid landing gear has been subjected to stringent tests on more than one helicopter type. It is much preferred by pilots, even for—one might say especially for—autorotative landings. Two jockey wheels are fitted just behind the helicopter's centre of gravity to facilitate ground handling. They are lowered manually when required.

It is significant to note, in parenthesis, that metal skids were first used experimentally by the U.S. Coastguard in 1945, and the inclusion of this type of landing-gear as standard equipment seems to mark the permanent acceptance of a new helicopter design-trend. Among the advantages they offer are greater stability on the ground and a saving of weight in relation to the conventional wheel undercarriage. On larger machines, no doubt, it would be necessary to employ some system of screw jacks, or power-assisted jacks, to lower the jockey wheels, four of which would be needed. For civil helicopters which are intended to operate over long stretches of water, skid-type landing-gear lends itself well to the carriage of emergency pontoon flotation-gear, which can be inflated, if necessary, by CO_2 bottles. The helicopter's known ditching characteristics make it seem likely that some form of flotation gear will be a necessary safety precaution when carrying passengers over such routes, even though twin-engined machines may be in use.

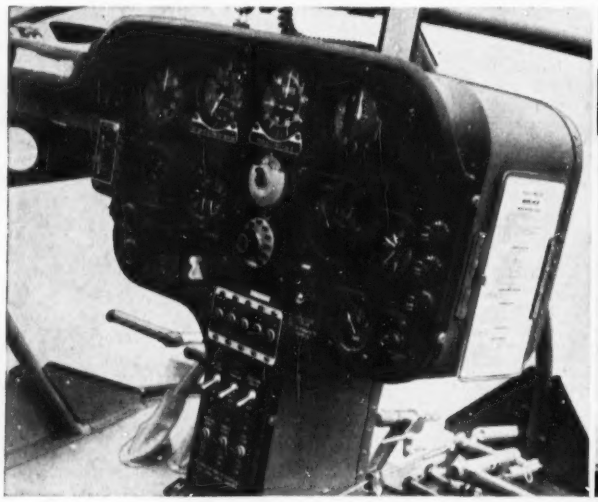


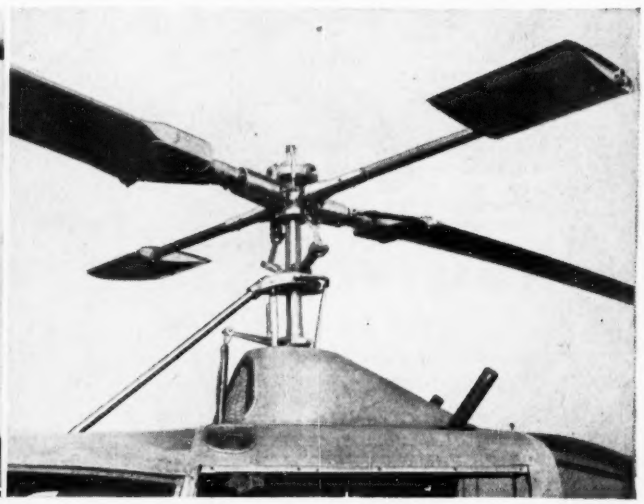
The 200 h.p. Franklin engine installation and rotor-head assembly (with redesigned collective ballast-weight system) of the new UH-12B. In spite of their small overall dimensions, the exhaust silencers are claimed to reduce the noise-level to 85 decibels at a distance of 100ft.

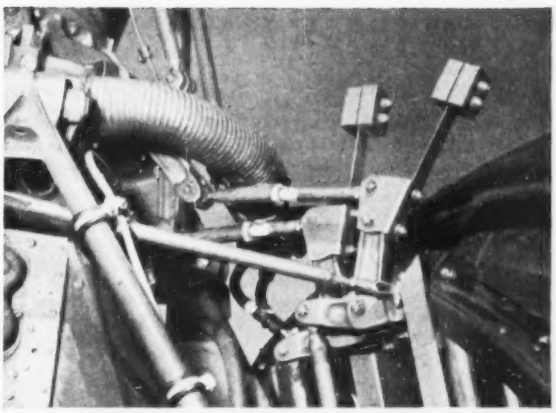
The Hiller organization has always held ease of maintenance to be a most important feature of helicopter design. The operational experience, both civil and military, which has been gained during the last few years has been put to good use in the UH-12B. Throughout the whole machine there is evidence of many refinements to this end. Certain engine accessories, such as fuel pumps and oil cooler, have been re-located where necessary to provide easy accessibility. Quick-release fasteners permit inspection below the floor, and the whole instrument-panel hinges at the pedestal for rapid instrument maintenance.

To achieve longer service-life of moving parts the transmission lubrication system has been completely revised. The tail-rotor

(Left) The neat new instrument-panel does not include blind-flying instruments, but they can be fitted if required. The pilot sits centrally, with one foot on either side of the pedestal. (Right) This view of the original Hiller 360 rotor-head affords a comparison with the new assembly illustrated above.







A close-up of the sprung weights which prevent cyclic vibration from being transmitted to the control column, one applies to fore-and-aft control, the other to lateral.

pitch-change bearings have also been modified for the same reason.

The rotor system has been improved by making provision to add small balance weights to the main-blade tips, and the control rotor has been fitted with roller bearings and provided with an adjustable-incidence device. The tail-rotor pitch-control arm has been redesigned to permit interchangeability.

An important feature with regard to the use of the machine as a training aircraft is the design adjustment made to the collective-pitch and throttle linkage to permit engine idling at high collective-pitch settings. This will enable practice autorotative landings to be carried out without the need to cut the engine on each occasion. On some helicopters a "de..." engine is necessary, as otherwise there is an r.p.m. increase which causes an undesired engagement of the centrifugal clutch when the collective-pitch lever is raised just before touching down. Autorotative landings with the engine cut are not to be recommended in training flying, if only on the grounds of the time wasted in restarting the engine between each landing.

Performance data relating to the UH-12B are similar to the data for the military versions. The weight empty has been reduced to 1,656 lb, leaving a useful load of 844 lb, an improvement of 44 lb over the figure for the Hiller 360. Top speed and cruising speed remain the same at 84 m.p.h. and 70 m.p.h. respectively. The service ceiling is 9,400 ft and, in still air, the hovering ceiling with ground effect is quoted as 3,200 ft at full load. The new machine has been given a C.A.A. approved type certificate.

B. H. A.

THE A.R.B.'s YEAR

THE 16th annual report of the Air Registration Board was made public at a luncheon which took place at the Savoy Hotel on June 18th (see page 801). In introducing the printed document Lord Brabazon, the chairman, states: "The past year has been an eventful one for British civil aviation because it marks the first passenger operation of turbine-engined aircraft." After referring to the opening of B.O.A.C.'s Comet services and B.E.A.'s Viscount services, Lord Brabazon continues: "The Board is able to share in the national pride in these achievements, and I take an early opportunity of congratulating all concerned with the design, construction and operation of these splendid aircraft."

Regarding United States acceptance of British certificated turbine aircraft, the report states: "Undue stress on detailed technical differences arising from national practices rather than the needs of safety in the air must not be allowed to obscure the issue and the mutual confidence which is so desirable between the two countries."

The period covered by the report has not been without problems, outstanding among which continues to be the fatigue of structures which the Board is studying intensively. The work is necessarily centred around the task of establishing safe lives for components. ". . . if adequate information is not obtained, it is necessary to impose a large margin to cover one's ignorance, and this in turn severely penalizes the operator," states the report. Failure of the main spar in a Central African Airways' Viking, which occurred at a lower number of hours than was expected for the particular component, had been accelerated by corrosion.

Specific items were then dealt with, and included the relations between the Board's Performance Committee and I.C.A.O., technical work completed in connection with British civil airworthiness requirements and prototype aircraft, and the various types of power-plant submitted for type test. In this last category, "seven new and ten modified aircraft power-plant installations have been approved during the past year, and here again the Board's knowledge of turbine installations has increased considerably in parallel with the experience of the operators."

Section 6 of the report refers to fuels for gas turbines. It states: "It is now more than ever apparent that the use of any fuel other than kerosene in turbine-engined aircraft will require much careful investigation."

The Board's work on flight testing, the report continued, had continued to expand in all its branches during the last twelve months. Full prototype investigations, including handling trials and in most cases performance checks, ranged from those on small aircraft such as the Dart Kitten and the Miles Aries to those of the Pioneer, Heron 1, Viscount 700 and the Universal Freighter.

Flight testing of series aircraft, which became necessary on high-speed, high-altitude types, was undertaken on all Series 1 Comets except one, and on the first five production Viscounts. Similar tests were in progress on several Comet 1As and Viscount 701 variants, the Board's principle being to fly the first of any type going to a new operator, together with spot checks on random production aircraft.

The revised General Maintenance Schedule for privately-owned aircraft, prepared in association with the Royal Aero Club, and which featured the three-year C. of A., would, it was hoped, result in a substantial reduction in the overall cost of maintaining a privately-owned aircraft.

Approval of design and inspection organizations is a routine matter not normally accorded special mention in the annual report. However, it is stated, the world-wide interest in Britain's new aircraft and the need for accelerated production has given rise to further sub-contracting by the parent firms. During the year ending March 31st, 1953, 360 firms were added to the A.R.B.'s list of approved organizations. In the future the Board's approval will not be confined to the U.K. Approval has been granted to an organization in Eire and applications have been received from France and Holland.

The Board had continued to assist the Ministry with the de-icing work at Boscombe Down, and had also embarked on an assessment of the merits of a number of airframe and engine de-icing systems. More recently, arrangements with the M.o.S. had been concluded for the Board to take part in the design investigation of certain helicopters ordered by the Ministry.

Regarding finance, the chairman said that a deficit—small though it is at present—has always appeared in the Board's accounts, but he believed that the plans made by the treasurer were bringing nearer the day when the accounts would be balanced in the accepted commercial form and there would be no need to rely on financial aid from outside sources. Having regard to the many and exacting responsibilities, the cost of the Board at less than £½ million annually was extremely modest in relation to the value of the standard of airworthiness which the Board had established.

Members of the Council who had retired by normal rotation on December 31st, 1952, and who had all been reappointed, were Mr. Whitney Straight (representing the operators), Mr. J. D. North (constructors), Mr. A. B. Stewart (insurers), and Lord Brabazon (independent).

Extracts from a tabular summary of the A.R.B.'s activities for the twelve months ended March 31st are as follows:—

	1952	1953
Certificates of Airworthiness		
Issue of prototype	2	2
Issue of prototype (modified)	22	33
Issue of series	237	272
Validation of foreign Cs. of A.	2	3
Renewals and revalidations	1,282	1,210
Commercial pilots' licences (technical examination)		
Issue	365	595
Extension	769	1,048
Glider Certificates of Airworthiness		
Issue of prototype	2	Nil
Issue of series	63	19
Renewals	5	4
Total number of aircraft on register	1,666	1,562
Total number of aircraft on register having valid Certificates of Airworthiness	1,223	1,189
Total number of current flight engineers' licences	254	301
Total number of current aircraft maintenance engineers' licences	3,668	3,555
Total number of approved firms' organizations	1,520	1,839

CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

Net-Type Arrester Gear

I WAS very pleased to read in *Flight* for June 12th, 1953, of the successful use of a simple net arrester gear by the U.S.A.F.

I have been confident of the value of this device since we originated it at Woodley over ten years ago. In 1943 we gave a demonstration to Sir Stafford Cripps and senior officers of the three services, which included flying a Messenger down-wind into the net with the wheels two feet off the ground. Neither the aircraft nor the pilot sustained any damage.

Several alternative uses for the net arrester system and its associated equipment were proposed at the time, but we were unable to obtain official sanction to continue our experiments under simulated operational conditions and, after some further demonstrations, the idea was reluctantly dropped.

Apart from the fact that no provision for protecting the propeller is necessary with jet aircraft, the principles used in the American development appear to be almost identical with those adopted at Woodley, and it is encouraging to have this unexpected confirmation that our proposals had practical value.

Sompting, Sussex. G. H. MILES.

Aviation and the Masses

YOUR correspondent Mr. W. H. Cazaly should count himself lucky that no airline has ever charged him extra freight for the outsize chip he carries about on his shoulder. It is precisely due to the generous sprinkling of types such as he amongst the educated classes (or, more precisely, the over-educated classes) that the general public keeps a distorted view of such things as flying, the cinema, television and so forth. With perverse pleasure and ill-concealed triumph they will go seeking out the worst possible way in which something can be used as an argument against using it at all; war use of aeroplanes is one example, crime on the screen another, and the outcry against television, on the grounds that it keeps children from doing homework, is perhaps the silliest. But by their very reputation as educated and, in many cases, quite brilliant individuals in their own fields, Cazaly and company influence the thinking of a large number of people.

Another, and subsidiary, argument given is that flying benefits only that mythical minority which lives in wealth and luxury and provides such excellent material for chips on shoulders. They, of course, are also "the people who make wars" (the North Korean Communists who started the one which, we hope, is about to stop now, will no doubt be flattered to hear themselves described as "wealthy and money-powerful"). By mentioning Chinese, Japanese and Indian magnates (there seem to be a surprising number of them, and increasing at that !), he tries to counter the valid objection that all manner of countries outside Europe and America now operate successful airlines.

What are the facts? Need we mention flood relief by helicopter, flying doctors in Australia and elsewhere, famine relief in India? Or does Mr. Cazaly think all this was done by magic carpet? It is precisely in large, partly undeveloped countries that the population (lacking, to boot, the gratuitous advice of alternative theorists) has come to appreciate the true value of air transport. This crammed and over-developed country has little scope for spectacular demonstration of the everyday usefulness of the air; and so it comes about that only those whose intelligence measures up to their education can appreciate fully the significance of flying.

A final thought. Whatever makes people like Mr. Cazaly read *Flight* in the first place?

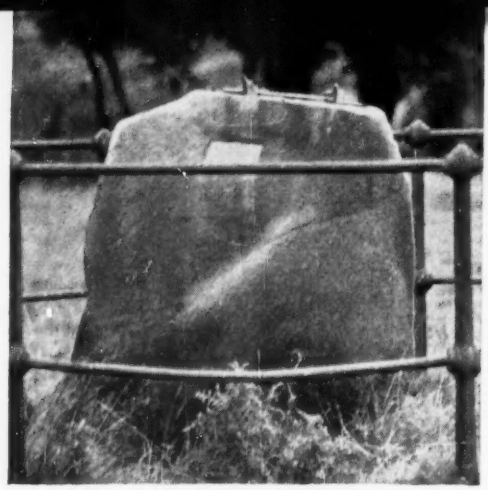
London, S.E.20. IAN S. MENZIES.

[Mr. Cazaly's letter (June 12th) challenged some views expressed in a *Flight* leading article on the attitude of the general public towards flying. In his view, aviation constitutes "the most destructive, wasteful and terrifying curse ever inflicted . . . by the wealthy and money-powerful minority."—ED.]

To Astonish Posterity

YOUR readers may be interested in the accompanying photograph of a unique memorial, known as the Balloon Stone, at Standon, Hertfordshire.

It marks the landing-place of Vincent Lunardi's flight by balloon from the Honourable Artillery's drill-ground in Moorfields, London, whence he ascended, before a crowd of 150,000 people, on September 15th, 1784—the first aerial voyage over England.



The "Balloon Stone," mentioned by Mr. J. Denton Robinson.

The stone, which is guarded with a strong iron fence, has a brass on the top bearing the following inscription:

Let Posterity know
And knowing be astonished
that
On the 15th day of September 1784
Vincent Lunardi of Lusca in Tuscany
The first aerial traveller in Britain
Mounting from the Artillery Ground
In London
And
Traversing the Regions of the Air
For Two Hours and Fifteen Minutes
In this Spot
Revisited the Earth.
On this rude monument
For ages be recorded
That Wondrous Enterprise
Successfully atchieved
By the Powers of Chemistry
And the Fortitude of Man
That Improvement in Science
Which
The Great Author of all Knowledge
Patronyzing by His Providence
The Invention of Mankind
Hath graciously permitted
To Their Benefit
And
His own Eternal Glory.

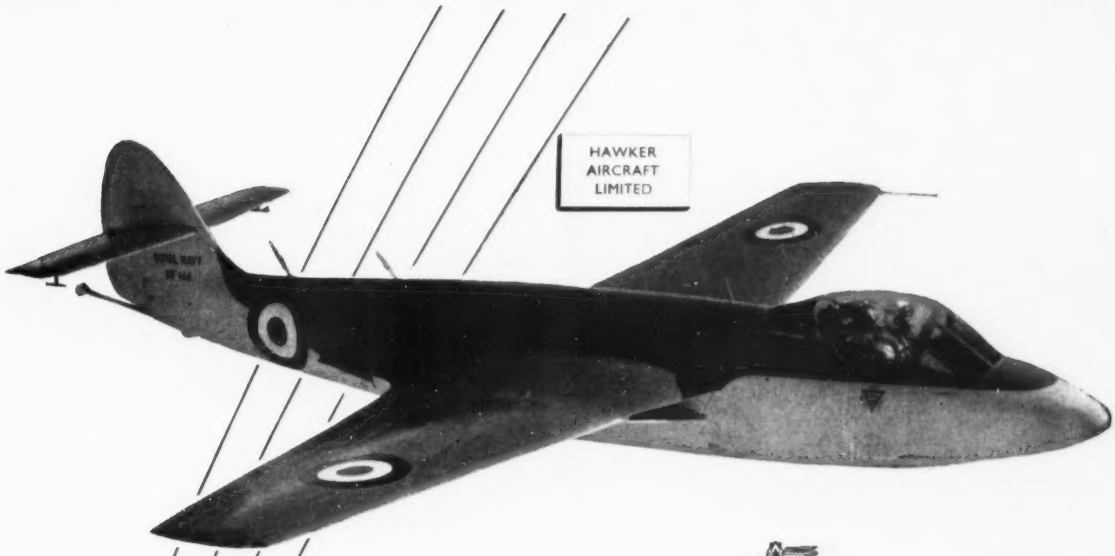
Darlington. J. DENTON ROBINSON.

[Though Lunardi's flight is generally recorded as being the first to be made in the United Kingdom, historians have adduced a certain amount of evidence to show that, some weeks earlier, the distinction had been achieved by an Englishman, one Tytler, who was reported to have made a successful ascent from Edinburgh in a hot-air balloon.—ED.]

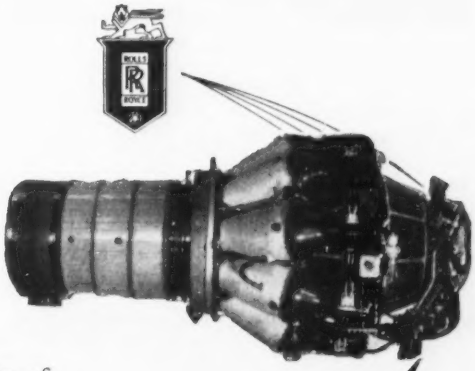
FORTHCOMING EVENTS

June 26-July 5. Paris Aero Show.
June 26. College of Aeronautics, Cranfield: Presentation Day and Ball.
June 27. Official opening of Ramsgate Airport and Flying Club.
June 27. "At Home," R.N. Air Station, Bramcote.
June 27. Aéro-Club d'Eure et Loire: Chartes Rally.
June 27-29. R.Ae.C.: Members' La Baule Rally.
June 27-30. Aéro-Club di Livorno: International Rally.
June 29. Combined R.Aux.A.F. Units: Ball.
June 30 Aircraft Recognition Society (Plymouth): "Twenty Questions" and Contests.
July 4-6. R.Ae.C.: Members' Deauville Rally.
July 9. Jersey Air Display.
July 11. "At Home," R.N. Air Station Anthorn.
July 11. Auster Flying Club: Display.
July 11. Cardiff Aeroplane Club: Display, Pengam Moors Airfield
July 12. Northern Heights Model Flying Club: Gala Day.
July 15. Royal Air Force Coronation Review.
July 18. Vintage Aeroplane Club: Rally, White Waltham.
July 18. "At Home," R.N. Air Station Brawdy.
July. 18. Royal Netherlands Air Force and Royal Netherlands Aero Club: N.A.T.O. Display, Soesterberg.
July 18-19. Aero-Club d'Italia: Dolomites Tour.
July 19. Aéro-Club de la Vendée: Sables d'Olonne Rally.
July 22. "At Homes," R.N. Air Stations St. Merryn and Arbroath.
July 25. "At Homes," R.N. Air Stations Ford and Stretton.
July 25. R.Ae.C.: National Air Touring Competition.
July 25-Aug. 3. B.G.A. National Gliding Championships, Great Hucklow.
July 26. R.A.F. Model Aircraft Association: United Kingdom Championships, St. Athan.
July 26. International Radio-Controlled Models Society: Aircraft Contests, Southend-on-Sea Airport.
July 27-Aug. 2. Aéro-Club de France: World Parachuting Championships Aix-le-Bains.
Aug. 1. Opening of Jan Smuts Airport, Johannesburg.

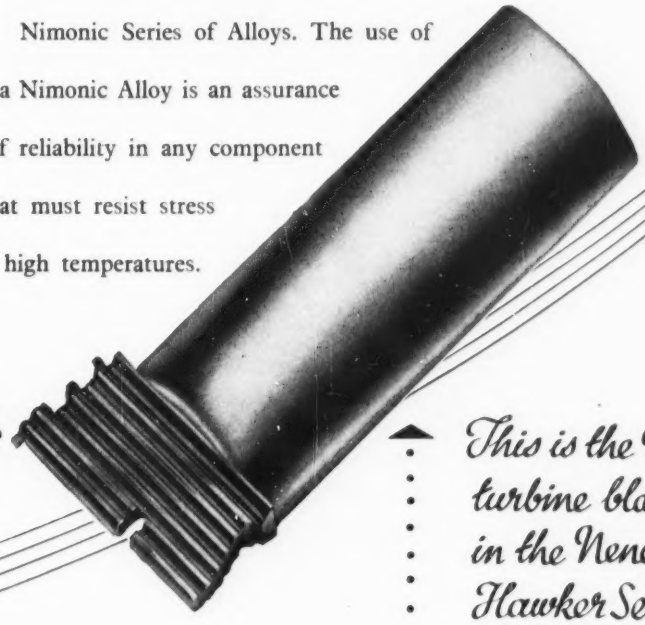
36 HT 45



One good trademark leads to another



Every British aircraft gas turbine has rotor blades made of one or another of Nimonic Series of Alloys. The use of a Nimonic Alloy is an assurance of reliability in any component that must resist stress at high temperatures.



This is the Nimonic 80A turbine blade that rotates in the Nene that keeps the Hawker Sea Hawk flying

Nimonic is a Registered Trade Mark

HENRY WIGGIN AND COMPANY LIMITED

WIGGIN STREET · BIRMINGHAM · 16

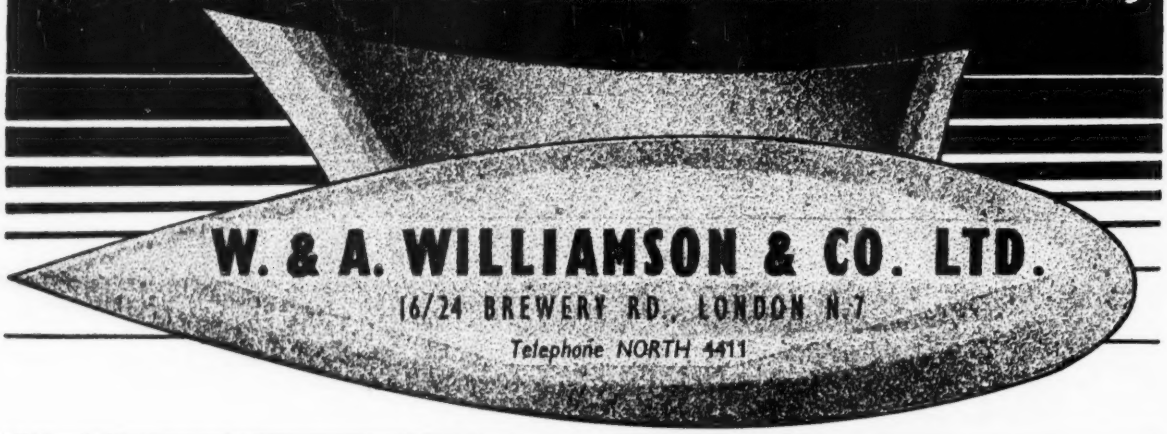
RESIN + GLASS FIBRE = HIGH STRENGTH, NON-CORROSION, GOOD ELECTRICAL PROPERTIES, HIGH TEMPERATURE RESISTANCE, DIMENSIONAL STABILITY

TO GAIN THE BENEFIT OF LONG EXPERIENCE IN MOULDING AND LAMINATING

ask Ashdowns

ASHDOWNS LIMITED · Eccleston Works · St. Helens · Lancashire. Telephone: St. Helens 3206. *Ashdowns Ltd. is a subsidiary of Pilkington Brothers Ltd*

Specialists in Sheet Metal Fabrication to the Aircraft Industry



W. & A. WILLIAMSON & CO. LTD.

16/24 BREWERY RD., LONDON N.7

Telephone NORTH 4411

Associate Company of:

BRITISH EMULSIFIERS LTD.

AID & ARB APPROVED

A A F C E

Part I: The Background to NATO and its Constituent Formations

By W. T. GUNSTON

THIS is the first of a series of articles dealing with the Allied Air Forces, Central Europe, in which this country plays so great a role. The remaining instalments will be concerned with the present AAFCE administration, and with the two tactical air forces which come under the Allied command. This introductory article is necessarily of a political nature and is intended to provide a background for the remainder of the series will be more intimately concerned with the work of the operational units.

IN the past there have been innumerable occasions when the armed forces of one country have co-operated with those of another to secure the downfall of a common enemy.

There have even been instances—particularly in the 1939-45 conflict—of members of an armed force serving under the command of a foreign officer, or even joining an international unit established to co-ordinate the activities of personnel whose own nations had been overrun. But all this took place under the unnatural conditions of a major war, and in 1945 almost everyone tried to return to pre-war conditions, by which one country co-operates with another in the diplomatic sphere, but rarely attempts to enter into any practical collaboration for mutual defence. Even today, there are many who cannot countenance the suggestion that their armed forces should in any way be integrated with those of another nation. "Tread carefully," they say, "and preserve a loop-hole in every agreement through which we can back out."

People who think along these lines would do well to examine the set-up of Allied Air Forces, Central Europe. Here, at least, is a most vital international force, if not in a finished state, at least in a harmonious working condition. It is no mean force. It embraces much of the air power of six major nations, carefully welded into a striking force capable of extreme potency in all tactical rôles.

The history of the North Atlantic Treaty Organization, and the present organization itself, are both far too complex for discussion here, but the following were some of the major stepping stones over which the present arrangement has been reached.

The war itself left, among other things, the Atlantic Charter and the United Nations Charter and, although both were commendable attempts to ensure peace, neither was designed to promote the establishment of any *ad hoc* international defensive organizations. Something to this end was at empted in March 1947, when the United Kingdom and France signed a fifty year "Treaty of Alliance and Mutual Assistance" at Dunkirk, and another most important step was taken in June of that year when General George C. Marshall, then United States Secretary of State, announced the plan, which bears his name, for the economic rehabilitation of Europe. Although principally designed to improve Europe's economic position, this plan also provided a strong motive force which propelled Europe into a closer unity with itself, as well as with the United States.

In March 1948, the Brussels "Treaty of Economic, Social and Cultural Collaboration and Collective Self-Defence" was signed

The first meeting of Gen. Norstad with his newly designated A.T.A.F. commanders in April last year. (Left to right) Air Marshal Sir Robert M. Foster, Gen. Lauris Norstad and Maj.-Gen. Dean C. Strother.

A A F C E . . .

by Belgium, France, Luxemburg, the Netherlands and the United Kingdom. The articles of this treaty went far towards creating not merely a blueprint for such co-operation, but practical plans for the translation of these ideals into action. The five signatory powers set up a consultative council which met in Paris the following month and established a permanent military committee to handle arrangements for common defence. Other organizations were established to handle military planning, production and supply, and a common defence force known as Uniforce was set up under the direction of Field Marshal Montgomery with headquarters at Fontainebleau.

Another factor, dating from June 1948, was the Vandenburg resolution which confirmed American determination "to exercise the right of individual or collective self-defence." Also in 1948, meetings of the Brussels treaty powers, together with representatives of Canada and the United States, took place in Washington. From these meetings the North Atlantic Treaty was a natural outcome, and it was signed on April 4th, 1949, by the foreign ministers of Belgium, Canada, Denmark, France, Iceland, Italy, Luxemburg, the Netherlands, Norway, Portugal, the United Kingdom and the United States. Norway and Denmark had been discussing a possible Scandinavian defence pact with Sweden; they were under diplomatic pressure from Russia to stay out of any Atlantic treaty, but in the event they did not do so. Greece and Turkey are more recent signatories and they acceded to the Treaty on February 18th last year.

The North Atlantic Treaty itself lays down a "one for all and all for one" system for collective defence, with the United States acting as a kind of benevolent supervisor, chairman and general post office. Quite clearly, the chief object of the treaty is the defence of Europe and the surrounding areas, and this part of the earth's surface was geographically split up into separate commands for easier handling.

The supreme NATO body is the North Atlantic Council which sits permanently in Paris. It is, in effect, an international cabinet whose present chairman is Mr. Kraft of Denmark; the vice-chairman and permanent secretary-general is Lord Ismay of the United Kingdom. In the autumn of 1950 the Council had decided that military security would not be possible without the "creation in the shortest possible time of an integrated military force, adequate for the defence of freedom in Europe."

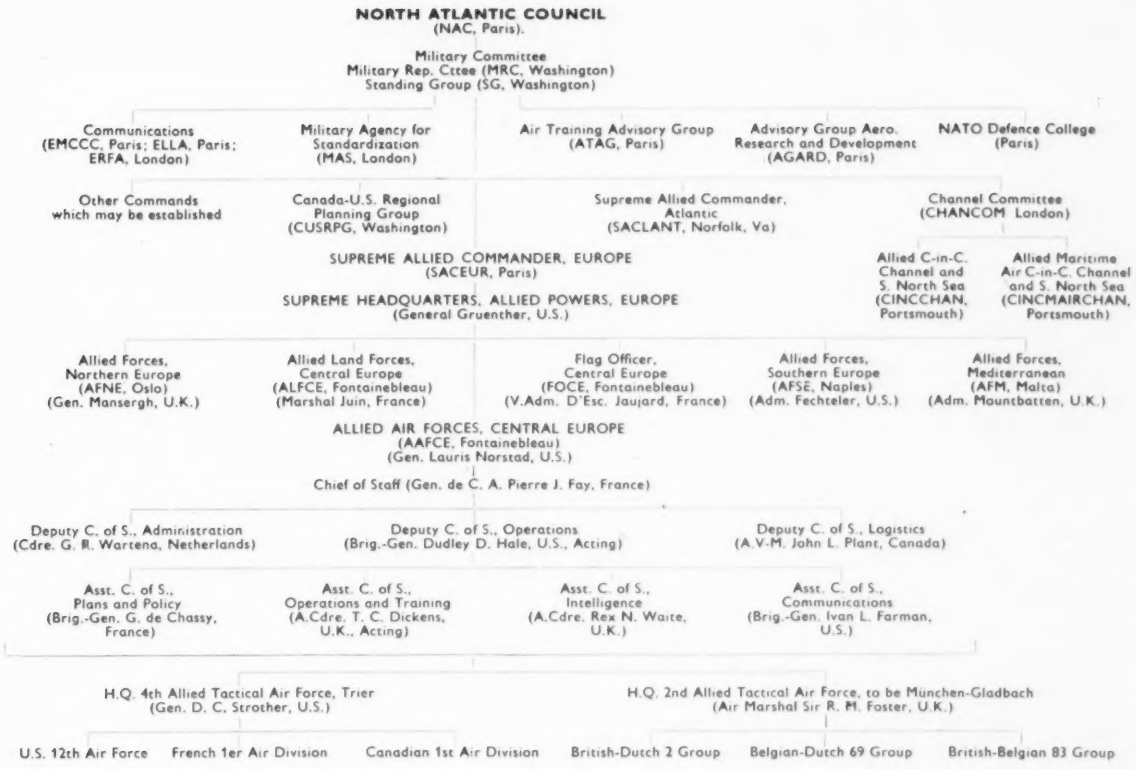
The Council also agreed that the United States should nominate the supreme commander, and the man chosen was General Dwight D. Eisenhower, a choice which the Council unanimously ratified. After a preliminary tour of European capitals, SACEUR (Supreme Allied Commander, Europe) proceeded to establish and develop SHAPE (Supreme Headquarters Allied Powers, Europe), and to select the officers of his command on an international basis. This procedure continued throughout 1951 and 1952, during which time other commands were established and integrated allied staffs were set up. Much other work went into the development of training, economic and administrative co-operation, as well as the establishment of a network of civilian technical liaison. International agreement was also reached on the financing of the first NATO infrastructure programme which consisted of airfields, communications and certain other basic and immovable installations for supporting forces. The first "slice" of infrastructure was originally estimated at £33m, and the second at £79m.

The present chain of command down to the operational units of AAFCE is shown in the "family tree" on page 827. The military committee is the supreme military authority of NATO and is composed of one of the chiefs of staff of each signatory power. The committee is not in permanent session, but meets whenever a body is required capable of giving the highest military advice to the Council or guidance to subordinate bodies. The Military Representatives Committee, on the other hand, is in continuous session in Washington to provide a fully representative body available to advise the Council on military affairs at all times. The members are representatives of various chiefs of staff. The Standing Group is composed of representatives of the chiefs of staffs of France, the United Kingdom and the United States, and is the superior body to whom the supreme commanders are responsible. Is also acts as the steering and executive body of the MRC and co-ordinates and integrates defence plans. This group also is in continuous session in Washington.

The geographic European command is the land area extending from the North Cape to North Africa and from the Atlantic to the eastern border of Turkey. This area comes under SACEUR, who is now General Gruenther. He is responsible, under the general direction of the Standing Group, for the defence of the entire European command. By far the most important of SACEUR's subordinate commands is Central Europe which extends from the base of Jutland to the Alps. As can be seen from the family tree, this command has been split into three, under military, naval and air commanders. The air commander is General Lauris Norstad, whose extraordinary capabilities had attracted the attention of General Eisenhower during the war. General Norstad was, in 1951, already in Europe as commanding officer of the U.S.A.F. in this theatre. It was, therefore, hardly surprising when he found himself, two years ago, faced with the directive to "gain and maintain air superiority over the central area and the approaches thereto . . . with forces allocated by me [General Eisenhower] to be constituted into a single integrated force. . . ."

Under the Brussels Pact, Western Union headquarters were already in being at Fontainebleau, 60 kilometres from Paris and roughly the same distance from SHAPE. AAFCE headquarters was established here, together with those of ALFCE and FOCE. Initially, AAFCE occupied some of the buildings of the historic Palace of Fontainebleau, but on July 19th last year moved into its new home, the façade of which is shown at the heading of this article. The total headquarters is housed in 40 structures, dispersed over 99.9 acres carved out of part of the Forest of Fontainebleau. Rarely can a headquarters have experienced so

For the past two years Air Vice-Marshal T. G. Pike (U.K.) has been Deputy Chief of Staff (Operations) at AAFCE. He is seen here receiving a silver memento from Gen. Norstad before leaving to take up his new appointment as A.C.A.S. (Policy) at the Air Ministry. Individual portraits of the AAFCE staff officers, who are all present in the photograph, will be published in the next instalment of this account.


NORTH ATLANTIC COUNCIL
(NAC, Paris).
Military Committee
Military Rep. Cttee (MRC, Washington)
Standing Group (SG, Washington)
Communications (EMCCC, Paris; ELLA, Paris; ERFA, London)
Military Agency for Standardization (MAS, London)
Air Training Advisory Group (ATAG, Paris)
Advisory Group Aero. Research and Development (AGARD, Paris)
NATO Defence College (Paris)
Other Commands which may be established
Canada-U.S. Regional Planning Group (CUSRPG, Washington)
Supreme Allied Commander, Atlantic (SACLANT, Norfolk, Va)
Channel Committee (CHANCOM London)
SUPREME ALLIED COMMANDER, EUROPE (SACEUR, Paris)
SUPREME HEADQUARTERS, ALLIED POWERS, EUROPE (General Gruenther, U.S.)
Allied C-in-C. Channel and S. North Sea (CINCCHAN, Portsmouth)
Allied Maritime Air C-in-C. Channel and S. North Sea (CINCMAIRCHAN, Portsmouth)
Allied Forces, Northern Europe (AFNE, Oslo) (Gen. Mansergh, U.K.)
Allied Land Forces, Central Europe (ALFCE, Fontainebleau) (Marshal Juin, France)
Flag Officer, Central Europe (FOCE, Fontainebleau) (V.Adm. D'Esc. Jaujard, France)
Allied Forces, Southern Europe (AFSE, Naples) (Adm. Fechteler, U.S.)
Allied Forces, Mediterranean (AFM, Malta) (Adm. Mountbatten, U.K.)
ALLIED AIR FORCES, CENTRAL EUROPE (AAFCE, Fontainebleau) (Gen. Lauris Norstad, U.S.)
Chief of Staff (Gen. de C. A. Pierre J. Fay, France)
Deputy C. of S., Administration (Cdre. G. R. Wartena, Netherlands)
Deputy C. of S., Operations (Brig.-Gen. Dudley D. Hale, U.S., Acting)
Deputy C. of S., Logistics (A.V-M. John L. Plant, Canada)
Asst. C. of S., Plans and Policy (Brig.-Gen. G. de Chassy, France)
Asst. C. of S., Operations and Training (A.Cdre. T. C. Dickens, U.K., Acting)
Asst. C. of S., Intelligence (A.Cdre. Rex N. Waite, U.K.)
Asst. C. of S., Communications (Brig.-Gen. Ivan L. Farman, U.S.)
H.Q. 4th Allied Tactical Air Force, Trier (Gen. D. C. Strother, U.S.)
H.Q. 2nd Allied Tactical Air Force, to be München-Gladbach (Air Marshal Sir R. M. Foster, U.K.)
U.S. 12th Air Force
French 1er Air Division
Canadian 1st Air Division
British-Dutch 2 Group
Belgian-Dutch 69 Group
British-Belgian 83 Group

A A F C E . . .

violent a change of surroundings, for the new building is as modern as the old Palace is mellowed and venerable.

General Norstad moved in to AAFCE concurrently with General Eisenhower's formal take-over at SHAPE at 0001Z, April 2nd, 1951. Under him were placed the two Allied Tactical Air Forces, as shown in the family tree, many of whose members had served with the Royal Air Force or U.S.A.F. during the war. General Norstad immediately started to collect an international staff and organize Exercise Ombrelle as a sequel to the "Cupola" Western Union air defence test of 1950.

Ombrelle, with 500 aircraft, served as a basis for Exercise Cirrus in the autumn of 1951, with forces twice as strong. Although it was an air defence exercise, Cirrus provided tactical air force defence for the French army in a simulated Rhine crossing. Its real significance came in the co-ordination achieved with Italy, Denmark and Norway, thereby putting eight nations aloft under single direction. These early flounderings (as they can be regarded in light of present knowledge) were enormously useful in beginning the integration of participating air forces, and almost all of the roughest corners were knocked off before 1952. Another far-reaching factor at this time was the large-scale allocation, under the Mutual Defence Air Programme, of F-84 Thunderjet fighter bombers to the air forces of France, Belgium, Holland, Denmark, Norway, Italy, Greece, Turkey and Yugoslavia, the last-named country not yet being part of NATO.

As far as the economic field is concerned, a start was made with the Schumann Plan, which provides for the pooling of the Central European coal, iron and steel reserves. The ultimate aim in this connection is the establishment of a universal pool, overriding all frontiers and tariffs, and this should be achieved with the establishment of the European Defence Community. Like the Schumann Plan, the E.D.C. emanates from the Council of Europe in Strasbourg and the E.D.C. treaty aims at a common block, politically, economically and militarily.

It also proposes the formation of a European Army, about which General Eisenhower had this to say in his annual report as SACEUR in April last year: "The European Defence Force would include land, air and naval units and their supporting elements. Basic ground units would be called *groupements* of about 12,000 men. The Air would be organized into Wing-size units. At this level, troops would not be mixed as to nationality, thus preserving the language, customs and *ésprit* of the home peoples. These basic units would be combined in larger military formations such as army corps, made up of elements of different national origin. The practicability of such integration was proved many times during the last war and is currently being demonstrated by our U.N. troops in Korea. When formed, the European Defence Force would be integrated under SHAPE in the same manner as purely national forces from the United States, Canada, the United Kingdom, and other countries not members of the European Defence Community. The new grouping would not modify, conflict with, or in any way supersede the North Atlantic Treaty Organization. The concept of a European Defence Force is the consolidation of military elements of five nations of the North Atlantic Treaty Organization with forces from still another nation, Western Germany. It cannot fail to increase greatly the effectiveness of our collective security and to facilitate the achievement of NATO aims."

Such forces would come into being only when the treaty is ratified, and this has been done to date only by the government of Western Germany. If, or when, E.D.C. is agreed upon, Western Germany will be required to provide air force formations organized as Wings, so that, for example, an air division might be composed of Wings from Western Germany, France and Belgium, the complete Division then being under the operational control of AAFCE. France is anxious that the United Kingdom should join the E.D.C., in case other nations use the arrangement as an excuse for re-arming to serve their own ends. We are not currently a member nation of E.D.C. but have guaranteed to support it for 50 years. NATO, incidentally, runs initially for 20 years, and thus has 17 more to go. Even NATO itself is not finalized, for the three military conventions are still not ratified by the member governments.

The first convention, regarding the state of the NATO armed forces, has been signed by all governments but ratified only by France. To be accepted, it must be ratified by four, but is at present acting as a suitable *modus vivendi*. The second convention is a protocol on the status of international military headquarters. It has been signed, but ratified by no parliaments. The third convention is an agreement between SHAPE and the French government which has been neither ratified nor signed. In each case, the governments accept an initial working paper, but each power must ask its parliament for approval before ratification. Thus, the whole NATO set-up may appear slightly shaky from the legal point of view (at the moment) but the thing that matters is that it is working and working well, albeit as a gentlemen's agreement, and the air forces in the field are powerful, international and efficient. We will have more to say about these forces in succeeding issues.

PLASTICS PROGRESS

Papers of Aeronautical Interest at the British Plastics Convention

THE British Plastics Exhibition and Convention, organized by our associated journal *British Plastics*, was duly held at Olympia, London, from June 8th-18th. As was expected, the event was, from all points of view, even more successful than that held in 1951.

In the exhibition itself were numerous items of interest to the aeronautical world, but the most prominent were two very large mouldings: the Miles plastic glider wing has already been described (*Flight*, May 15th), and beside it was a 14ft-diameter radar reflector aerial, constructed (by F. G. Miles, Ltd., for A. C. Cossor, Ltd.) in impregnated asbestos and weighing only 345 lb. The material is completely non-corrosive, and so strong that weight is more than halved for a given strength.

Amongst the lectures, those applicable in some degree to the aircraft industry were given on Wednesday, June 10th. In the morning came *Surface Chemistry and Adhesion of Glass and Plastics*, by H. Cole, M.A., F.R.I.C., F.S.G.T., of Pilkington Bros., Ltd.; *Plastics Containing Asbestos as a Reinforcing Filler*, by J. E. Gordon, B.Sc., P. H. H. Bishop, B.Sc., and P. L. McMullen, D.L.C. (Aero Eng.), all of the R.A.E., Farnborough; and *A Critical Survey of Commercial Low-Pressure Laminating Resins*, by V. E. Yarsley, D.Sc., F.R.I.C., F.P.I., and A. G. Goodchild, B.Sc., A.R.I.C. In the afternoon there followed two further lectures which were of sufficiently close application to aviation to merit summarizing here. Fuller details of these two lectures will appear in the July issue of our sister-journal *Aircraft Production*, and complete details of all the lectures are in due course to be published in book form by *British Plastics*.

Asbestos-Fibre Materials, *by D. S. Bancroft, A.F.R.Ae.S., of the Plastics Division of F. G. Miles, Ltd.*—Phenolic-asbestos materials, said the lecturer, could be fabricated by four distinct processes. The no-pressure method gave products generally suitable as low-strength components, although its use for more highly stressed parts should not be dismissed. It could be shown that a structure such as an aircraft rib could be made satisfactorily by the process, whereas an attempt to make a similar component by a pressure method would not only be far more expensive and time-consuming (especially if production was on a small scale), but would also end in failure, since the rib, being thinner for a given weight, would itself fail through instability.

Vacuum moulding (at approximately 10 lb/sq in) was particularly suited to the forming of large structures, giving a very good strength/weight ratio, yet requiring relatively simple tooling. One-piece mouldings of over 200 sq ft had already been fabricated, and others up to 600 sq ft were being considered. Material density was of the order of 1.25. Medium-pressure moulding (50-200 lb/sq in) came into its own when large-scale production was envisaged, as the higher tooling costs were then justified. The method was most applicable where complete structures could be fabricated in one operation. The use of high pressures (over 200 lb/sq in) had been examined, but, said the lecturer, he himself had not yet encountered a structural problem where such a technique was desirable.

Turning next to the design of moulds, Mr. Bancroft said that this almost equalled product-design in importance, so great was the effect of the one upon the other. For no-pressure work, plaster of Paris had proved itself an excellent material, especially for expendable moulds that could be destructively removed, and for small-scale production. An alternative method was to use aluminium, which, besides having a much longer life, was not prone to warping at the temperatures of 80-90 deg C required for curing plastics: plaster of Paris did tend to warp if the moulds were of small cross-section. Aluminium had the further advantage that it could be melted down and re-used. An interesting point was that a light but important pressure could be applied in no-pressure work simply by wrapping the product tightly with some material, such as Cellophane, which shrank under suitable conditions.

Passing on then to the problems associated with vacuum-moulding, Mr. Bancroft reiterated the best applications of the method, and said that a 200 h.p. generating set coupled with a large vacuum pump was sufficient basic equipment for moulds up to 1,000 sq ft in area—although a fair amount of control gear and associated equipment was required.

A problem that became particularly acute where large mouldings were concerned was that of controlled heating. First, it was necessary to be able to measure the temperature at various points in the product, and this could only be done by means of thermocouples, which were far from easy to use accurately. Then a suitable number of heating mats must be provided, and so connected that current to each of them could be controlled at will. It should then be possible to arrange a production routine which could often provide a product accurate to within, say, 0.025in of the required profile.

Having settled on the vacuum and heating arrangements, one could then proceed with manufacture of the requisite mould or moulds. The number of major and minor problems that could arise was, again, very considerable, but the difficulties had always proved soluble. It should be remembered, went on Mr. Bancroft, that vacuum technique did not give quite such a smooth surface as a pressure method, and that—although the face of the product next to the mould was accurate in profile—the other face, next to the rubber bag, was far more difficult to control in shape. This might lead to difficulties in certain applications.

Finally, said the lecturer, there was the question of the moulds required for low-pressure techniques. Whereas for vacuum moulding a semi-porous mould or mat was required to enable the volatiles to be drawn off, when a pressure of 50 lb/sq in or more was used certain phenolic-asbestos materials would form a satisfactory product whilst retaining all the volatiles. This meant that metal male and female moulds could be used if desired.

Higher pressures of the order of 150-200 lb/sq in were useful where complicated mouldings were concerned, and where large production was envisaged; but a problem with this type of work was the correct design of the press-tool and loading procedure in order to arrange fibre-orientation in the correct manner. Two further problems were the time taken to produce the required relatively complex tooling, and the extensive alterations required in this tooling for every minor modification of the product.

Glass Fibre Materials, *by G. C. Hulbert, B.Sc., of Scott, Bader and Co., Ltd.*—Glass-reinforced materials, said the lecturer, showed such advantages over earlier plastic materials that it was only too easy to overlook their limitations. It must be remembered that the cost of the new materials was extremely high, and that that of the products must be reduced to an acceptable value by various means, such as expanding production and design of structures to take full advantage of the material by reducing the number of components that would otherwise be required in metal.

Although a designer rarely had a structure exhibiting uniformity of load, he was constantly striving towards uniformity of stress, this condition being the goal of efficiency. With traditional materials he was restricted to rods, bars, sheet, extrusions and forgings and was frequently driven to expensive machining operations to introduce tapers and such-like variations of cross-section in the search for stress-uniformity. Frequently also he required most of his strength in one direction and, to obtain it, had to carry redundant strength in complementary directions. This necessity entailed excess weight and material waste and, therefore, inefficiency. With glass-reinforced materials, because of the potential control of fibre orientation and the ease with which infinite variations of cross-section could be achieved (a property inherent in all mouldings), it would be seen that a comparison based upon performance in an actual structure would show the material in a more favourable light than one based on strengths realized as a new material.

A serious problem arose when it became necessary to transmit loads from a glass-laminate into or out of a metal structure. Normal bolting or riveting techniques created local stresses which prevented the body of the laminate from being loaded to more than a fraction of its working stress. Adhesion provided a partial answer to the problem—particularly if it was used to join the glass to a metal insert, and the insert was then riveted or bolted to the main structure. Adhesion between the metal insert and the plastic was by no means easy to effect, but certain epoxide resins had proved satisfactory, either as coatings for the insert, or as the actual laminating resin—and shot-blasting followed by aluminium spraying of the metal surface sometimes provided an adequate surface to which poly-ester resin could adhere.

For prototype work, an attractive feature of poly-ester resins was that they could be moulded without heat or pressure; but when production was envisaged the associated problems increased rapidly, and new techniques and special-purpose tools needed developing. Another important point which required attention was the provision of suitable parting agents, so that mouldings could satisfactorily be removed from tools; and yet another was the fact that there was no non-destructive test yet in existence which was sensitive to all the faults that might exist in a laminate. However, as with welding of old, time and usage would probably provide confidence in the process, and it was therefore doubly important that all articles manufactured during this early period in the history of the material should be sound and successful.

ROLLS-ROYCE PRODUCTION OUTLOOK

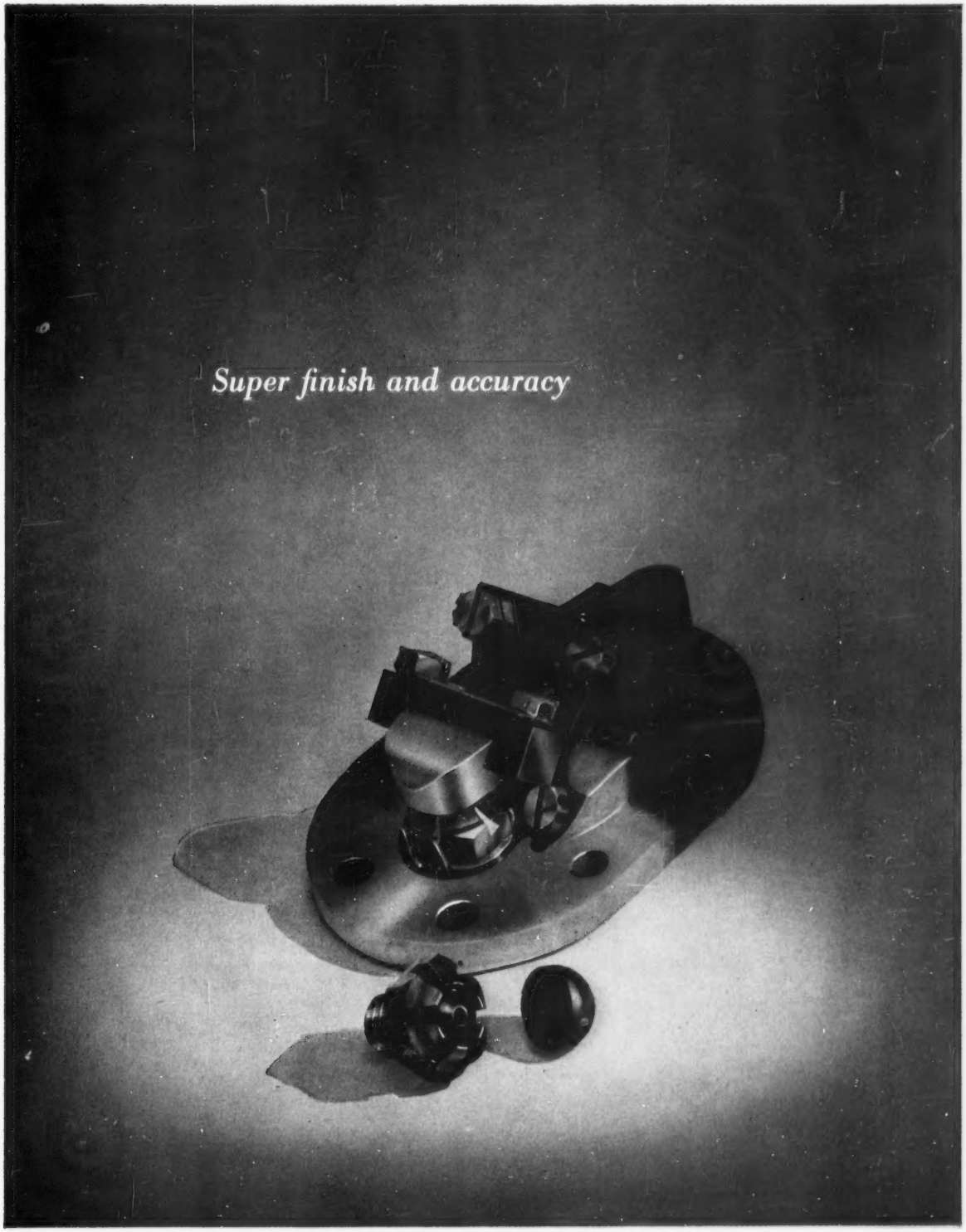
IN a message to Rolls-Royce employees in the current issue of the firm's house-journal, Lord Hives (chairman) comments on newspaper reports that, owing to the rearrangement of the Government aircraft programme, there might be a shortage of work at the company's factories, particularly at Glasgow. He writes :—

"I would like to allay any fears that we are contemplating laying off workers. The actual position is that we are desperately short of labour to carry out the latest programme.

"The Press obtained their information from evidence given before the Select Committee on Estimates. This evidence was given last March, but we had anticipated these adjustments in the programme many months previously, and our production plans have been arranged accordingly.

"We must accept that we shall be faced with competition, and we must be prepared to meet it. Your Management is fully alive to this, and we are extending our markets in all countries so that we are less dependent on British Government orders.

"Since the beginning of 1953 we have taken firm orders for over eight million pounds' worth of new commercial business. The Rolls-Royce products are fully maintaining their pre-eminent position throughout the world. At all times, however, we must give of our best with hard work and enthusiasm."

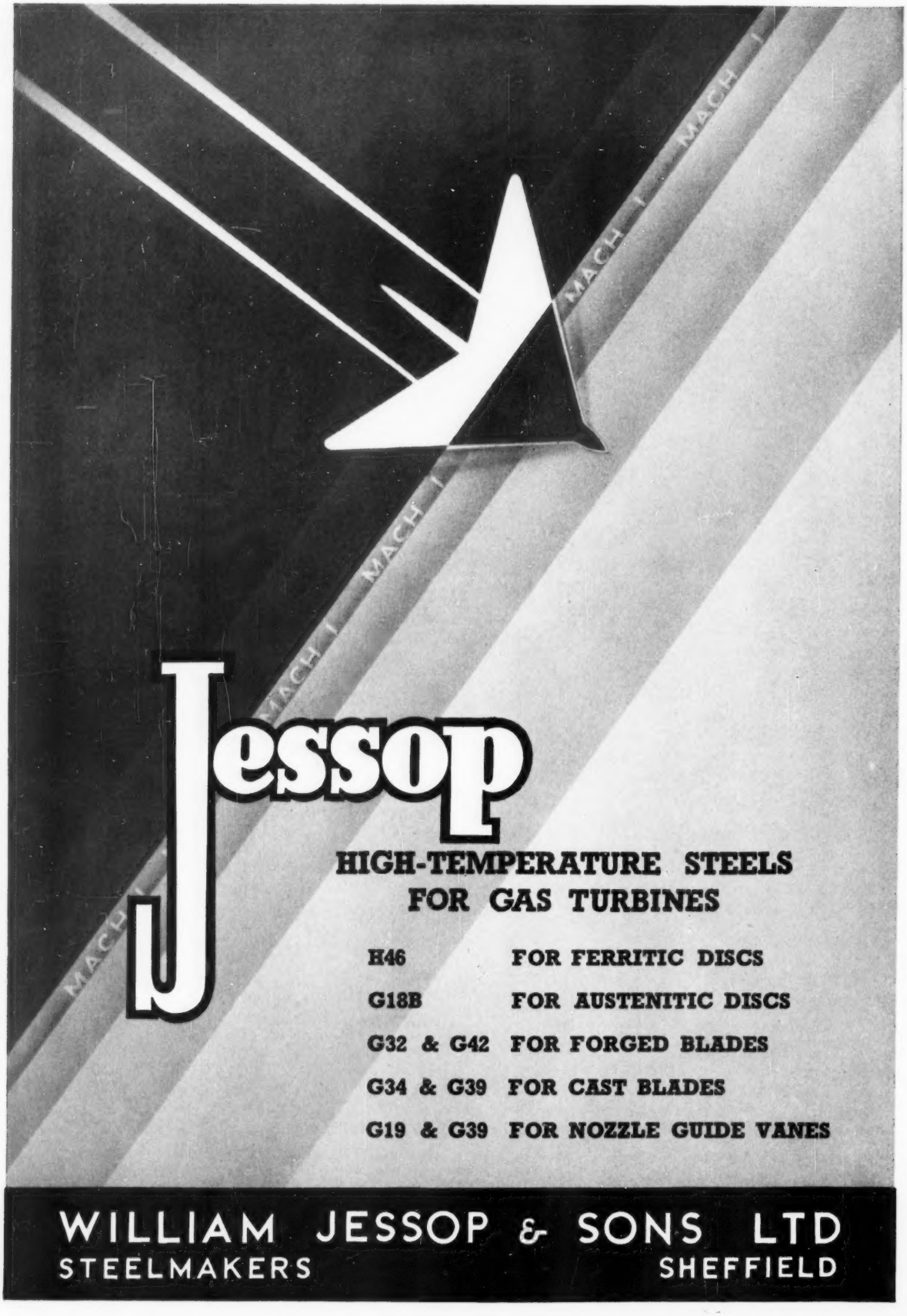


No. 2. Precise and immediate control of fuel is achieved by the frictionless design and extreme dimensional accuracy of this amplifier valve for pumps and control units.

FUEL AND COMBUSTION SYSTEMS FOR GAS TURBINE ENGINES

LUCAS

JOSEPH LUCAS (GAS TURBINE EQUIPMENT) LTD., BIRMINGHAM & BURNLEY


MACH 1
MACH 1
MACH 1
MACH 1
Jessop
HIGH-TEMPERATURE STEELS
FOR GAS TURBINES
H46 FOR FERRITIC DISCS
G18B FOR AUSTENITIC DISCS
G32 & G42 FOR FORGED BLADES
G34 & G39 FOR CAST BLADES
G19 & G39 FOR NOZZLE GUIDE VANES
WILLIAM JESSOP & SONS LTD
STEELMAKERS
SHEFFIELD

THE INDUSTRY

Quick Carbon-removal

WIDELY used by aircraft and engine manufacturers and operators in America, Canada and Australia, Magnus 755, an immersion-type cleaner for removing carbon deposits from engine components, is now being made available in Great Britain. Arrangements have been made by the Magnus Chemical Co., Ltd., 39 New Broad Street, London E.C.2, for its manufacture here, and a technical advisory service on the best methods of use in cleaning baths has also been organized.

Except in a few special cases, Magnus 755 is used in admixture with water, and water is also used for rinsing. Four types of bath are commonly used, the choice depending on the nature of the work and on the speed required: cold or hot still tank, or cold or hot agitated tank. Most carbon deposits, it is stated, can be efficiently removed in less than 15 minutes, especially if the hop-dip process is used.

Versatile Woodworker

THOUGH wood is now less widely used in aircraft construction, most firms in the industry still employ it for a variety of special purposes. A new machine that should be a valuable saver of time and labour in any woodworking shop—the T-S Mk III Universal—is described in a leaflet from its makers, Thornton-Stewart Woodworking Machines, Ltd., Brithorn Works, Telscombe Cliffs, Newhaven, Sussex. Powered by a built-in 4 h.p. electric motor, it is capable of some 20 different tasks, with capacity for a wide range of material sizes.

Aerocontacts Appointments

FROM Aerocontacts, Ltd., Gatwick, comes news that W/C. H. G. Cattell, D.F.C., has joined them as sales manager; he was formerly, for many years, with Titanine, Ltd. Another Aerocontacts appointment is that of S/L. A. G. Stanley, an ex-R.A.F. technical officer, who has for some time been with Tiltman Langley Laboratories; appropriately enough, in view of his initials, he will be in charge of sales of a.g.s. parts, and also of raw materials. Lastly, Mr. M. H. Nicholas has been appointed manager of the SCOBA (Supplies Co-ordinating Organisation for British Aviation) scheme in succession to Mr. E. H. Newman, who has suffered ill-health and is no longer with the company.

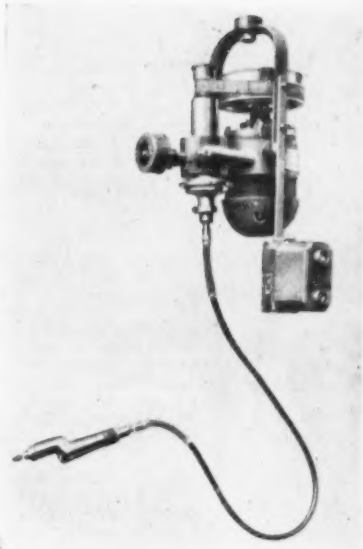
W/C. H. G. Cattell.

New Flexible-shaft Equipment

LONG known as specialists in flexible-shaft grinding and other tools, B. O. Morris, Ltd., Briton Road, Coventry, have lately added two more machines to their extensive range.

The first is a high-speed grinder, giving tool speeds of 20,000-30,000 r.p.m. by belt-change. The flexible shaft runs at 10,000-15,000 r.p.m., the final stepping-up being afforded by compactly arranged gearing in the handpiece. The outstanding advantage claimed is that the 1 h.p. motor gives constant power at constant speed, an important consideration if the best results are to be obtained from tungsten-carbide cutters. The machine is available for floor, bench or overhead mounting.

The second new Morris machine is a disc driver, with constant-speed 2 h.p. motor, designed to provide ample power and optimum speed for the new fabric-reinforced grinding discs. Like the other, it has three alternative mounting methods.



The "Morrisflex" high-speed grinder.

For Sheet-forming

A HIGH-LIFT clamping beam, to take right-angle forming blades, large-radius blades and mandrels, and a stepped-down bed, to take small return bends, are features of the new "Besco" heavy universal folding machines, redesigned and introduced in five sizes by F. J. Edwards, Ltd., 359-361, Euston Road, London, N.W.1. Capacities are 14 s.w.g. mild steel for the three smallest sizes and 16 s.w.g. for the two large machines.

Effective Dusting

AN ingenious "adhesive duster" which should be of use in the cleaning of airliner interiors, and, in industry, for final cleaning-down of components before delivery, is now being marketed. The fibres are impregnated with a non-drying adhesive which nevertheless does not give a "tacky" feeling to the touch. The duster can be folded for use as a pad giving 32 surfaces, each of which, it is stated, can be used until it is black. The price to the general public is 2s 6d, but this figure is reduced for quantity orders; the material is also available in 50 yd rolls. The manufacturers are Adhesive Dusters, St. John's Street, Kates Hill, Dudley.

THE SHARP END (Continued from page 821)

testing their guns before take-off; but next morning I found that the guilty parties were Sabres, harmonizing their "fifties."

Before moving forward next day I looked in on W/C. D. A. S. Morgan, senior medical officer of 91 (Composite) Wing, for a chat about casualty evacuation. He recalled that the first lift of Commonwealth casualties from Korea to Japan by a Dakota of the unit was on January 15th, 1951, since which date well over 10,500 patients have been lifted. R.A.F. personnel came into the overall cas. evac. scheme about three months later, and the R.A.F. Casualty Air Evacuation Flight (commanded by F/O. J. Dickson, assisted by F/O. D. Aubin) is now fully integrated with 91 Wing.

Casualties for "tactical" evacuation to Japan are delivered from the front by train, helicopter or road, and are received either at the British Commonwealth Communication Zone Medical Unit or the 121st U.S. Evacuation Hospital. Here they are screened by an R.A.F. or R.A.A.F. medical officer to determine their fitness for evacuation. If accepted they are held in the Casualty Evacuation Flight until an "economical" load has accumulated. A Dak. then comes over with an R.A.A.F. nursing sister (of which there are six, under Senior Sister H. Cleary) and the casualties are delivered back to Iwakuni. There they stay for 2-4 hr, for treatment, food and a wash in the 91 Wing sick quarters before being moved to the British Commonwealth General Hospital at Kure. By ambulance rail-coach or ambulance launch this is about 2 hr distant. When ready for "strategic" evacuation the casualties are returned to Iwakuni, whence—if they are Australians or New Zealanders—they are flown home on a chartered Qantas Skymaster, with medical escorts of the R.A.A.F. Nursing Service. If they are British, their aircraft is a Hastings of Transport Command and they have R.A.F. escorts.

By mid-February this year 514 patients had been flown to Australia and 1,161 to the United Kingdom.

I felt sorely in need of W/C. Morgan's attention after a jeep-ride to an advanced Army post, though it is true that the pain occasioned thereby was mitigated in some degree by numbing cold. The cure proved to be steak and eggs and a camp-bed in a warm tent.

I shall not forget that night: it was the eve of Korean Independence Day and the frozen, moon-washed hills were twinkling with bonfires and fire-crackers. Yet a little up the road massed Allied artillery was thundering against a threatening enemy. Perhaps it made sense; I am hardly competent to judge on such brief acquaintance with the forward areas. After all, what sounded to me like a sizeable enemy shell outside my tent around midnight proved to be only a friendly grenade.

CLUB AND GLIDING NEWS

FIRST member of the firms' flying clubs trained at the Denham Flying Club to reach solo standard was Mr. P. Cuddeford, of Rotax, who did so last month. The club flew 188 hours during May, and have recently taken delivery of their new Autocrat, obtained with the help of the Kemsley Flying Trust. The work of equipping and furnishing the new crew-room, being carried out entirely by club members, is nearing completion; progress observed on a recent *Flight* visit was most impressive. We understand that Denham Airfield itself is being offered for sale by the present owner, Dr. Myles Bickerton.

SUNDAY next, June 28th, has been chosen by the Fair Oaks Aero Club for their tea patrol, first of a series of functions and competitions planned for the season. (Elstree Flying Club's tea patrol, as reported in *Flight* last week, is also on the 28th). It is hoped soon to provide regular transport to the airfield from Woking Station for the convenience of members of the Fair Oaks Club, who flew a total of 145 hours last month.

FAIR OAKS AIRFIELD's other occupants, the London Transport Central Road Services Sports Association Flying Club, held their annual spot-landing contest on June 7th. The winner was Mr. M. Samett (see photograph below), who at the time had but 40 minutes' solo flying experience. When not driving the red Tiger Moths of the C.R.S. Club from Fair Oaks, Mr. Samett pilots a London Transport trolley-bus from the Stonebridge Park bus depot.

DATE of the Flying Display to be organized by the Cardiff Aeroplane Club at Pengam Moors has been changed to July 11th. The display will include an arrival competition, and exhibitions by Vampire and Meteor aircraft and, it is hoped, an Olympia sailplane.

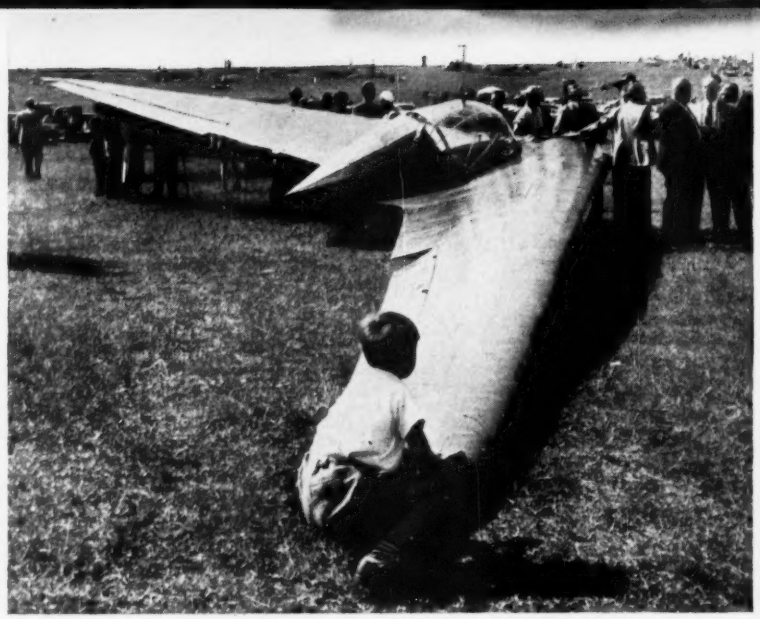
AS reported in *Flight* last week, the F.A.I. has been asked to confirm a new world record for two-seater gliders set up by a Soviet pilot, Ilchenko, and a passenger. On May 21st they flew 520 miles from Moscow to near Stalingrad in nine hours. The previous two-seater distance record was set up when Kartachev and Savtzov flew 385 miles from Moscow in July, 1938. The single-seater distance record, after being held by the Russian woman pilot Klepikova for 12 years, was gained by Dick Johnson (U.S.A.) in 1951 with a flight of 545 miles from Texas to Kansas. He was airborne for 8¾ hours.

It is clear that such distances are close to the maximum obtainable in one day's gliding. The strength of the sun on the ground is adequate for the production of the "thermals" for barely nine hours, even in the centre of the larger land-masses; thus unless a pilot can remain airborne all night by hill-soaring and await another day's sunshine, these records are going to be very difficult to beat. Further, in the cramped cockpit of the glider, the pilot will be exhausted after nine hours of struggle against gravity. For him there are no navigational aids and, although his path is occasionally straight and on track, much of the nine hours must be spent in tight circling in rough thermal currents to climb the total of 100,000ft necessary for him to reach his goal.

While the circling is going on, the mean speed over the ground is only that of the wind; but cruising from one thermal to the next is done at 70 or 80 kt, which may mean a ground-speed of over 100 kt. It may seem that a day of very strong winds is suitable for such records, but the thermals on such days are broken up and soaring is made very difficult.

It is clear that these distances cannot be achieved in Great Britain. The U.K. single-seater record is 257 miles (Farnborough to Newcastle, by Bill Bedford), but the two-seater record is a mere 118 miles. This latter record will surely be broken as soon as a high performance two-seater sailplane is available. The Slingsby T.21 and T.31 gliders are trainers, and the German Kranich, on which the present record was made, is now obsolete. The new two-seater being built under the sponsorship of the British Gliding Association, the Kemsley Flying Trust and the Ministry of Supply to the design of Hugh Kendall should be flying this year, and it will no doubt provide the means for new U.K. records.

Gliding performances in the United Kingdom cannot be compared with those in the U.S.A. or U.S.S.R. because of the very different thermal conditions and cloud-base. The true comparisons are those obtained in championships such as in Madrid in 1952, which Britain won. In 1954 the World Championships will be in our own Derbyshire. The Americans are certain to come; the Russians may come too if the cold war continues to thaw. How will they fare in British summer weather?



TAILLESS TWO-SEATER: Here seen at a recent gliding rally at Augsburg, Germany, is the Horten XVc "Urubu." It will be recalled that single-seat Horten XV machines were flown by Argentine pilots in the World Gliding Championships in Spain last year.

AT DUNSTABLE, the London Gliding Club's T-21B continues to be intensively used for club training. Here Gillian Lynne assists Francis Essex and Joan Gadson to prepare for a flight over the ridge.

PLEASED WINNER (right) of the Central Road Services spot-landing contest was Mr. M. Samett (see report above).

The Sycamore is seen hovering over the cornered Vanguard as the "criminals" attempt to get away on foot. (Lower right) Aerial policeman's view of the stolen car as it attempts to escape down a side road.

AIR ARM OF THE LAW

FURTHER details are now available of the recent successful experiment—referred to under the heading "Helicops" in *Flight* of May 22nd—in which a Bristol Sycamore helicopter was used to track down a "stolen" car.

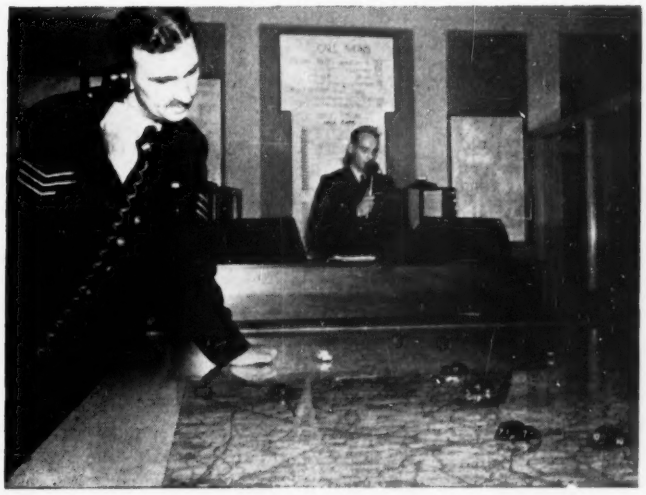
For the purpose of the exercise three police officers, acting as criminals, were reported to the Warwickshire police as having committed an armed robbery at Silverstone sub-post-office, and as having made off in a Vanguard station wagon stolen from a car park at Silverstone Airfield—where races were in progress. A description of the men and the registration number of their vehicle were given, and also the fact that the thieves were heading towards Banbury. A subsequent message reported the car as having left Banbury in the direction of Southam and Coventry, but stated that no police car was available.

At this stage of the proceedings, the Sycamore, flown by Bristol test-pilot Peter Wilson and carrying a navigator and a police radio operator, was on traffic control duty in the Helmdon area. Acting on radio instructions, it set off into the area where the car was last reported, and within a few minutes had succeeded in identifying the vehicle in spite of the fact that there was total uncertainty as to what route the criminals would attempt to follow. A game of hide-and-seek ensued, with the helicopter cruising along at about 200ft and the Vanguard twisting and turning about the Warwickshire roads without having the slightest success in avoiding the baleful eye of the law hovering above.

Fourteen minutes after the first sighting report, the chase came to an end with the stolen car sandwiched between two police Jaguars that had been guided to the spot by the helicopter's signals.

Discussing the exercise later, Brigadier P. D. W. Dunn, commandant of the Coventry Police College, stated that the helicopter had put up a most impressive performance; whilst the criminals —returning to their proper rôle of police officers—claimed that the psychological effect of being inexorably followed by a helicopter could scarcely be exaggerated, and said they thought that men really on the run would probably panic under such circumstances.

Helicopters have already proved their worth in clearing traffic bottlenecks; in New York they have now been employed for five years in all types of police work; and there seems little doubt that they can be of extensive use in this country if the economic difficulties can be overcome.



The scene in Warwickshire police headquarters operations room at the start of the exercise. The white model represents the stolen station wagon.

CIVIL AVIATION

THE I.C.A.O. ASSEMBLY : WORLD DELEGATES CONVENE

AS reported briefly in last week's issue, the seventh session of the Assembly of the International Civil Aviation Organization opened at the Royal Pavilion, Brighton, on Tuesday, June 16th. This followed the convening of the 21-member Council of the organization the previous Wednesday, and was attended by representatives of 46 member-States, five other countries and ten international organizations. The Assembly, of some four weeks' duration, was under the presidency of Sir Frederick Tymms.

After the session had been opened by the president of the Council, Dr. Edward Warner, a message of welcome from the Queen to the delegates was read by Mr. A. T. Lennox-Boyd, Minister of Transport and Civil Aviation. In her message, the Queen said :

> "Civil Aviation is very much an international activity, and I.C.A.O. is an outstanding example of practical co-operation between the nations. Consequently, its work is of paramount importance. The organization has already made a great contribution to the establishment of standards of safety which the airlines of the world are proud to maintain.
>
> "From personal experience of flying on some of the international routes, I am well aware of those high standards, and I am confident that with the ever-increasing traffic on the international airways, I.C.A.O. will always remain vigilant for the safety and comfort of those in the air."

Mr. Lennox-Boyd referred to the lively interest in aviation taken by both the Queen and the Duke of Edinburgh. He then went on to remark that the Assembly was meeting in the 50th anniversary year of the first heavier-than-air flight, by Orville Wright in 1903. Today, there were scheduled operations by turbojet and turboprop aircraft. In the field of passenger carriage, the story of aviation development was one of immense romance.

Wilbur Wright, he continued, probably carried the first passenger in 1908. This year it looked as though some 50 million passengers would travel by the scheduled airlines of the world. The first flight in 1903 lasted for 50 metres, and was probably the total distance covered by an aircraft in that year. This year, it was probable that scheduled airlines would fly more than 1,700 million kilometres. It was a matter of comfort and reassurance that, for 35 of the 50 years since flying began, there had been international agreement and international organization for safety in the air. The work of I.C.A.O., he concluded, was of great value, not only for safety in the air, but as a practical lesson to the world of the form that co-operation between nations should take.

The agenda before this session of the Assembly—which meets every three years—is heavy. Following the plenary meetings come items involving the Executive Committee and the Technical, Economic and Administrative Commissions. The programme of the future work of I.C.A.O. in the technical field is a wide and important topic. It includes, for instance, the further development and implementation of international standards, recommended practices and procedures.

A particularly important topic which is the concern of the economic commission is the question of commercial rights—more precisely, the prospects of and methods for further international agreement on such rights in international air transport. At the last assembly, in 1950, it was resolved that the time was not yet ripe to attempt to reach a multilateral agreement on commercial rights, but the Council was asked to make a further report later. The main development envisaged was the possibility of a policy-change on the part of a sufficient number of governments to make it reasonable to expect that a generally accepted multilateral agreement might be achieved.

No definite evidence has become available that a general change of policy of this sort has occurred, but countries have now had considerably more experience of the workings of bilateral agreements, and some new information has become available concerning both the views of contracting states and the way in which international air services have developed under the present system of bilateral agreements.

During the opening stages of the session, Cdr. J. W. Backer, from the Netherlands, said that the introduction of tourist fares would result in a passenger-traffic increase that would strain the resources of the airlines. This meant that there was less necessity than ever for contracting states to safeguard the interests of their national airlines by imposing restrictions on foreign airlines. Another action early in the session was the admittance of Honduras to membership of I.C.A.O., bringing the total number of member-States up to 60.

Pleasure at the decreasing number of forms and documents required in air travel was expressed by Dr. Warner, the president, reporting on the organization's activities during the past year. Several States, he said, had already dispensed with embarkation and disembarkation cards, and relatively few still required written baggage declarations or currency forms. Dr. Warner hoped that the aim would be to exempt air travellers from any requirement not imposed on rail and road travellers. Excess documents had tended to increase the cost of international air travel compared with internal air services, and he hoped that the discrepancy could be reduced, if not eliminated, by cutting the number of forms.

A revolution in aircraft power plants was now fairly upon us, continued the president. "The jet and turboprop airliners present new opportunities and new obligations to the airline operators, new attractions to the patron of air transport and new problems, in consequence, of the provision of ancillary air navigation services and new needs for international agreement and common action for which I.C.A.O. must be ready."

The Council of Europe, he continued, had asked I.C.A.O. to call a conference to study the possibilities of improving the position of air transport in Europe and to suggest measures of co-ordinating the existing framework. The latest of many general recommendations from I.C.A.O. was the standardized specifications for approach lighting at aerodromes, which they had recently evolved.

The Council of I.C.A.O., Dr. Warner concluded, was investigating all aspects of aeronautical knowledge with the assistance of the different governments. There were still some deficiencies in that knowledge, notably in the provision of upper-air meteorological observations in many parts of the world, and in surface observations during the night and very early morning.

S.L.A.E. ASSOCIATE MEMBERSHIP EXAMINATIONS

THE General Council of the Society of Licensed Aircraft Engineers has announced the introduction of the associate-membership examinations, for which provision was made a year ago by amendment of the Society's constitution. Regulations to govern the examinations have been drawn up, and the preparation of the syllabus has been completed by the various planning panels set up by the Society for the purpose.

The examination standards are high, and the examinations will require from candidates a sound basic knowledge of all branches of aircraft maintenance engineering, in addition to a thorough knowledge in the candidate's specialized field. The range of the syllabus covers the requirements of engineers engaged in the maintenance, overhaul, repair and testing of airframes, power units, helicopters, aircraft instruments, aircraft electrical installations and equipment, and radio and navigational aids.

It appears that the S.L.A.E. examinations will fill a real gap in the qualifications available to aircraft maintenance engineers. Hitherto, the profession has been recognized solely by the inspector's qualifications of the licences issued by the A.R.B., under authority delegated by the Minister of Civil Aviation. It is the intention that the Society's Associate Membership examinations will provide aircraft maintenance engineers with an additional qualification, complementary to their licences, as proof of their abilities as engineers rather than as inspectors.

In the immediate past, the professional aircraft maintenance engineer's sole qualification has been transitory, in that he has been licensed for particular aircraft or mechanism types. Consequently, he has been faced with taking fresh examinations at frequent intervals throughout his career, or alternatively his qualification has become valid for progressively obsolescent or near-obsolete aircraft or mechanisms. This situation has been completely unrelated to those in other engineering professions, and by the introduction of the S.L.A.E. examinations, it is hoped to remove this anomaly.

The S.L.A.E. examinations and associate membership qualification will be open to both licensed and unlicensed aircraft maintenance engineers. The period of practical experience required before engineers become eligible for Associate Membership has been set at five years in the case of licensed aircraft engineers, and seven years for non-licensed engineers.

Further details of the new scheme may be obtained from: The General Secretary, the Society of Licensed Aircraft Engineers, Finsbury Circus House, Blomfield Street, London, E.C.2.

Modern Survival Equipment for the Modern Airliner . . . the

RFD LIFEJACKET TYPE 50 C MK 2

FAVOURED BY AIRLINE OPERATORS THE WORLD OVER FOR **MINIMUM** PAYLOAD PENALTY AND STOWAGE SPACE AND **MAXIMUM** OPERATIONAL EFFICIENCY

The World's lightest civilian Air Sea LIFEJACKET, it is strongly constructed of the finest materials, ensuring a long life. It costs less to maintain and is therefore extremely economical. Operationally it is the simplest to don and inflate—inspiring confidence in an emergency. It supports the head in the best upright position and will roll an unconscious person over from the face down position.

The R.F.D. Lifejacket, Type 50C Mk. 2, is in service with, R.C.A.F., British Commonwealth Pacific Airlines, K.L.M., Air France, Sabena, Aer Lingus, Scottish Aviation, Tasman Empire Airways, New Zealand National Airways, Canadian Pacific Airlines, Air India, India National Airways, Deccan Airways, Bharat Airways, West African Airways, Malayan Airways, Aero O/Y, Braathens S.A.F.E., and many other airline and charter operators.

20TH SALON INTERNATIONAL DE L'AERONAUTIQUE
LE BOURGET - STAND 47

R.F.D LTD COMPANY

M.O.S. DESIGN APPROVED A.R.B. DESIGN APPROVED

Pioneers in Design, Development and Manufacture of Air and Sea Survival Equipment

GODALMING • SURREY • ENGLAND

TELEPHONE: GODALMING 1441 • CABLES: AIRSHIPS, GODALMING

RFD (CANADA) LIMITED · GRANBY, QUEBEC

RFD (AUSTRALIA) CO PTY LTD · MELBOURNE, VICTORIA

RFD J 19

National Air Races 1953

KING'S CUP AIR RACE

1st

DE HAVILLAND CHIPMUNK

(Gipsy Major 10c Engine)

flown by Pat Fillingham

GIPSY ENGINES: 1st, 3rd, 4th, 6th, 7th, 8th, 9th, 10th

GROSVENOR CHALLENGE CUP

GIPSY ENGINES: 1st, 3rd, 5th, 6th, 7th, 8th

NORTON-GRIFFITHS CHALLENGE CUP

GIPSY ENGINES: 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th

KEMSLEY CHALLENGE TROPHY RACE

GIPSY ENGINES: 1st, 2nd, 3rd, 6th, 7th, 8th, 9th, 10th

DE HAVILLAND

FRENCH COMET: Pictured in flight for the first time is a de Havilland Comet 1A of Air France; this machine is the second of three ordered by the French national airline. Comet services on the company's routes from Paris to Cairo and Beirut will begin later this summer.

CIVIL AVIATION . . .

SILVER CITY'S DOUBLE-DECKER

AT Toulouse last Tuesday, Silver City Airways took delivery of a Breguet 761 Deux Ponts, which is to be used for three months on the "minor airlift" between Berlin and Hamburg. This period of service, during which the aircraft will be on hire from the manufacturers, will give Silver City an opportunity to evaluate the performance and economics of the Deux Ponts, which has a 15-ton payload.

RONALDSWAY'S NEW TERMINAL

AN impressive new terminal building at Ronaldsway Airport, Isle of Man (illustrated on pages 800-801), was due to be opened on Wednesday, June 24th, by the Lieutenant Governor of the Isle of Man, Sir Ambrose Dundas Flux Dundas. Several important guests were expected to attend the ceremony, including Mr. A. T. Lennox-Boyd, Minister of Civil Aviation, Lord Terrington, chairman of the Air Transport Advisory Council, Lord Douglas of Kirtleside, chairman of B.E.A., and A.V-M. Sir G. R. Bromet, a former Lieutenant Governor of the island.

C.P.A. COMET DECISION

CONTRARY to an earlier announcement, Canadian Pacific Airlines will not inaugurate their Comet 1A service between Sydney and Honolulu this year. The company's Australian manager, Mr. M. R. McMorran, has announced in Sydney that the service could not be operated with only one aircraft [the first was lost at Karachi in April on its delivery flight], and that alternative plans for using the remaining Comet on C.P.A. routes were being considered.

EUROPEAN SERVICES REDUCED

FOR different reasons, two major European airlines have recently been forced to suspend a number of services. On June 16th, 10,000 members of the staff of Air France, flight crews included, staged a 24-hour strike and 28 services were cancelled.

On Sunday, as an "extra precautionary measure," B.E.A. withdrew 17 of their Vikings for modification to wing-spar fittings. In order to prevent corrosion through inter-action between the steel bolts and light alloy lugs joining the outer wings to the main wings, cadmium-plated pins are being fitted, together with cadmium sleeves in the lugs. It is stated that the customary 9,000 hr inspection has not disclosed evidence of corrosion, although it has occurred in aircraft used by other companies in tropical climates. Seventeen services were cancelled on the Sunday and nine the following day, but all the Vikings were expected to be back in service by the end of this week.

REPORT ON THE COMET ACCIDENT

NOT unexpectedly, the form of the official report from Calcutta on the inquiry into the Comet disaster (page 781 of *Flight* last week) has given rise to some comment in addition to that regarding the contents of the report. For example, an opinion has been expressed that many ordinary people are going to regard it as a very businesslike document to be compared with official reports in this country and in America, whereas, in fact, it has a much less sound basis in view of the modest experience and more limited qualifications of those taking part. There are those who feel that very few people have much experience of the design or operation of jet airliners, and that those who have not, should, in a report of this sort, have confined themselves to fact-finding at the scene of the accident.

On one or two occasions recently *Flight* has commented on the practice of holding public inquiries and issuing statements about aircraft accidents without proper explanation. Technical assessments and incomplete reports can be most misleading to the daily Press, and therefore in turn to their great public readership. An example of this suggested to us is the significance attributed to the failure of both the Comet's wings at rib 7, which was also the point at which they failed during the makers' tests. Far from being mysterious and indicating necessarily that this is indicative of a weak spot in the Comet wing design, it is the point at which this particular wing design would be expected to fail if subjected to extreme loads in excess of all accepted safety margins.

In support of the argument that courts or investigating committees should restrict their activities purely to fact-finding at the scene of the accident, however well qualified they may be, is the example of the accident to the D.H.110 at Farnborough. This occurred in the full view of thousands of people, among whom were some of the most experienced aeronautical experts in the world. A large number of photographs and cine-photograph records were made right up to the moment of disintegration, and there were flight-observer records of all prior flights for this machine. All the components were gathered up within a mile or so of the R.A.E., which is the centre of technical investigation in Great Britain. The full resources of the manufacturer were also readily available. Even so, it was many months before the sequence of structural failure could be established, and the probable and possible causes of the accident determined.

THE CORPORATION'S FEBRUARY FIGURES

DURING February this year, both British airline Corporations and the associate companies experienced marked increases in passenger traffic compared with the figures for February, 1952. B.E.A. carried some 70,000 passengers—an increase of 37 per cent—and the total passenger miles flown (19,683,000) was 33 per cent more than a year ago. Passenger-miles flown on domestic services were 50 per cent above last year's figure. Freight and mail loads fell by 14 and 27 per cent respectively.

B.O.A.C. carried more than 20,000 passengers, a seven per cent increase over the number for February last year; the increases were

NUCLEAR NAMES have been given to the fleet of 13 Super Constellations ordered by K.L.M. Thus, the first aircraft, PH-TFP, has been named "Atom," and the second (illustrated here) is "Electron." A note on interior furnishing appears on the following page.

CITY CLOCK-FACE: The scene on the blitzed site at Liverpool following the demonstration landing of the Bristol 171 (see report below).

CIVIL AVIATION . . .

greater on eastern rather than on western routes. Passenger-miles flown on Atlantic routes fell by eight per cent, and the passenger load factor decreased from 63 to 53 per cent. There was no significant change in the passenger load factor on the eastern routes. Freight traffic in both areas remained at about the same level as the previous year, while mail ton-miles increased by six per cent.

Total ton-miles performed were 9,197,000 (B.O.A.C.), 2,496,000 (B.E.A.), and 202,000 (associates); representing increases over February, 1952, of 4.7, 24 and 70.3 per cent respectively.

LIVERPOOL HELICOPTER DEMONSTRATION

A DEMONSTRATION landing by a Bristol Type 171 helicopter on a blitzed site in the heart of Liverpool on Thursday, June 11th, was described by Sir Alfred Shennan (leader of Liverpool City Council) as a "step forward in the city's investigations" regarding a central helicopter landing site. The demonstration had been arranged by the City Council and the Bristol Aeroplane Company.

The Lord Mayor of Liverpool (Alderman W. J. Tristram), with civic representatives, was present when the helicopter—piloted by Mr. C. T. D. Hosegood—landed on the blitzed site; later, accompanied by Sir Alfred Shennan and Mr. H. T. Hough (City Engineer), he took a brief flight in the machine.

At a reception at the Adelphi Hotel afterwards, Mr. Raoul Hafner, Bristol chief helicopter designer, told civic representatives of his visit to the recent I.A.T.A. conference at Puerto Rico, and outlined the findings of the Helicopter Symposium.

THE NEW SALISBURY AIRPORT

THE new airport which will eventually serve Salisbury, Southern Rhodesia, and which was the scene of the recent Rhodes Centenary Air Rally (see pages 802-803), is situated some 7½ miles south of the city.

Early in 1951 construction work was begun—as a matter of some urgency—in order to provide an airfield from which the Southern Rhodesia Air Force could train operational pilots as a major part of the state's contribution to Commonwealth defence. The S.R.A.F. have been using the base now for almost a year, successfully carrying out their training programme. The S.R.A.F. base has been sited so that the buildings are on the opposite side of the main runway to the civil aviation buildings, taxi tracks and hardstandings which will eventually be constructed.

The airport possesses a two-runway layout, the main 8,400ft tarmac runway running S.W.-N.E. and the 4,500ft secondary runway running N.W.-S.E.

EXHIBITION AIRLIFT

HERMES, York and Viking aircraft have been chartered from Airwork, Ltd., for use during the period of the Rhodes Centenary Exhibition. On June 18th, the full Hallé Orchestra, with Sir John and Lady Barbirolli, were due to fly by Hermes aircraft from Blackbushe to Bulawayo, where they are performing during the opening period of the exhibition. Other performers being flown out to Bulawayo by Airwork include the Sadlers Wells Theatre Ballet company, the Covent Garden Opera Company, John Gielgud and his *Richard II* company, and the Edinburgh Police Pipe Band. The total number of artistes involved is some 400, and the flights, which began on May 25th, will continue until the end of August.

TURBO-COMPOUND SUPER CONNIE

THE new turbo-compound-powered Super Constellation, following a 48-day test period, recently received a C.A.A. certificate qualifying it for public service. The first machine, destined for K.L.M., was due to arrive at Schipol Airport, Amsterdam, last week, to begin a series of tours of the European capitals. Phrases from the makers' announcement refer once again to the new interior: "club-like lounge, with murals . . . sofa-type seats . . . bulkheads of rich wood . . . wall-to-wall carpeting . . . luxurious fabrics . . . and leather . . . ten-cubic-foot refrigerator . . . diffused lighting and four washrooms"; and, finally, "its compartmentation gives more passenger privacy." For complete privacy, no doubt, there is always the refrigerator—though, presumably, without murals. The second of K.L.M.'s Super Constellations is illustrated on page 833.

BREVITIES

THE Ministry of Civil Aviation announces that Mr. C. M. Colback has been appointed south-western divisional controller at the Ministry's Headquarters at Bristol in succession to A.V-M. W. B. Calloway, C.B.E., A.F.C., who retired from the appointment on June 15th.

* * *

The total of international traffic transactions through the I.A.T.A. clearing house in London during April was $17,934,000 (£6,415,000), an increase of $625,000 (£223,500) over the turnover for April, 1952. By offsetting the credit and debit balances of its 35 member airlines, the clearing house was able to eliminate the need for cash payment and foreign exchange premiums of 89.7 per cent of the month's transactions.

* * *

Elevation at British civil airfields is at present based on the mean elevation of the touch-down points of the runways. As a result of a recent I.C.A.O. agreement, this country is now under an obligation to quote as airfield elevation the highest usable point on the landing area. The effects of this change on altimeter settings and chart values are discussed in M.C.A. *Information Circular* No. 68/1953, dated June 17th.

* * *

From Brazil comes the news that the export/import department has allotted a total exchange of $5 million in two six-monthly quotas, for the import of essential parts and accessories for the aircraft of the country's commercial carriers.

* * *

A revised form of general declaration has been introduced in the second edition of the I.C.A.O. Annex 9, which comes into force on July 1st. Details are given in M.C.A. *Information Circular* No. 67/1953, dated June 17th.

* * *

Mokuji Araki, chief of the Japanese Government Aviation Bureau, who is acting as an observer at the I.C.A.O. assembly at Brighton, is believed to be exploring the possibilities of Japan's entry into the organization.

* * *

Tomorrow, June 27th, is the date of Sabena's first flight between London and Strasbourg, calling at Luxemburg. The flight will be operated as a tourist-class service.

* * *

All the 37 C-54 aircraft leased by the U.S.A.F. to private operating companies in the U.S.A. have been recalled by the Service, it is reported from Washington. Pan American have been operating 16 of the aircraft, Trans-World Airlines two, and North West Airlines five. The remainder have been used by eight non-scheduled companies.

* * *

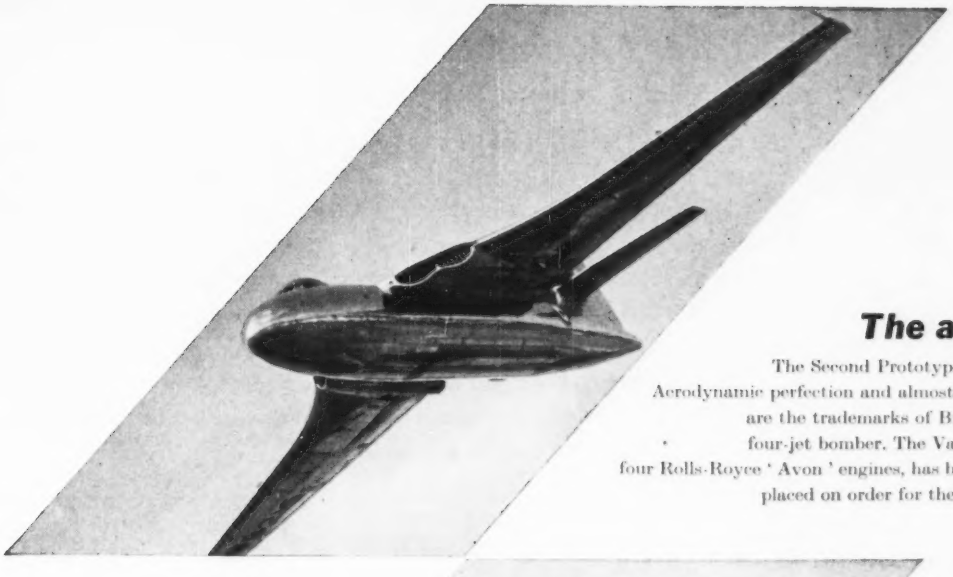
Increased activity is reflected in the traffic figures for May published by the Paris airports, Orly and Le Bourget. Total aircraft movements amounted to 8,520; passenger movements numbered 156,980 (an increase of 37 per cent over May, 1952); and a 10 per cent increase in freight handled was reported, the total for the month being 2,489 metric tons.

* * *

Middlesborough Corporation General Purposes Committee decided on June 16th to recommend the Corporation to defer, until further details were available, their decision on a scheme for Teeside local authorities to help finance Greatham Airport, West Hartlepool.

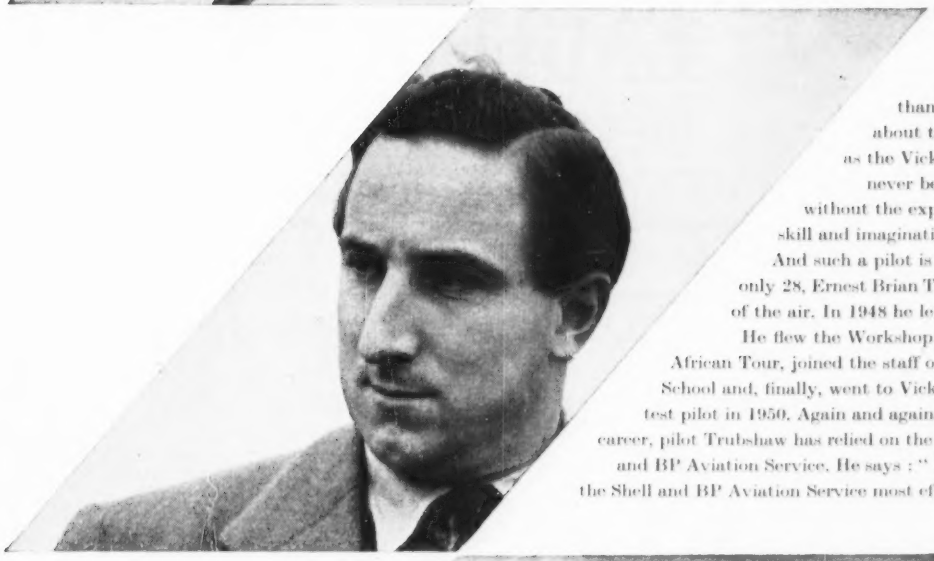
* * *

Two B.O.A.C. Stratocruiser flights were recently made to carry telegraph equipment and operators of Cable and Wireless, Ltd., from London to Bermuda to augment the telecommunication facilities there during the forthcoming three-power conference.



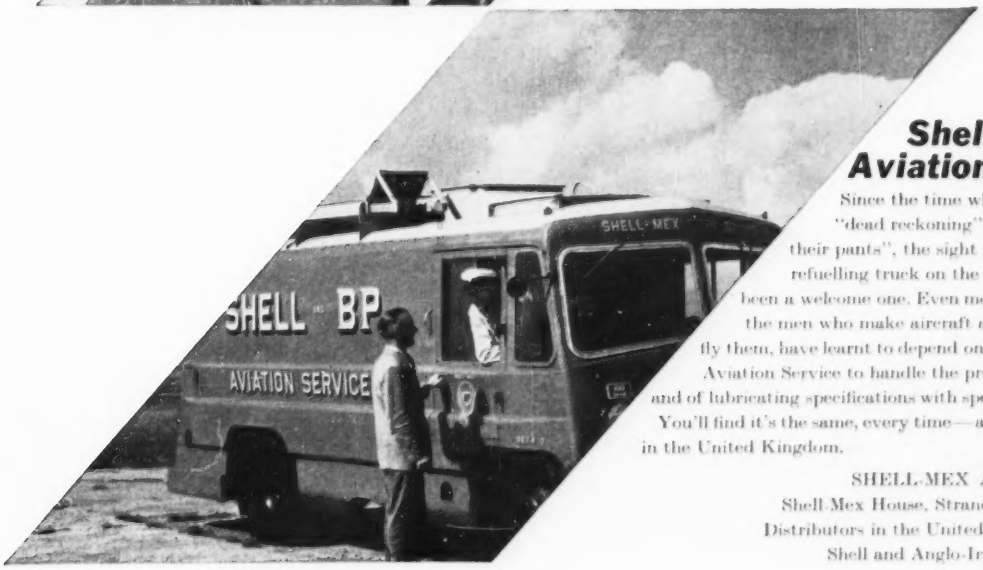
The aeroplane

The Second Prototype Vickers Valiant. Aerodynamic perfection and almost terrifying beauty are the trademarks of Britain's celebrated four-jet bomber. The Valiant, powered by four Rolls-Royce 'Avon' engines, has been approved and placed on order for the Royal Air Force.



the pilot

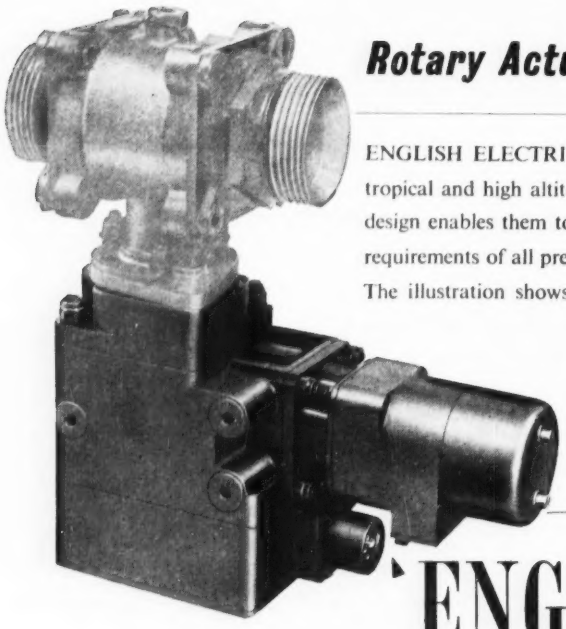
Aircraft with more than a hint of the future about them — aircraft such as the Vickers Valiant — could never be more than a dream without the experience, professional skill and imagination of the test pilots. And such a pilot is E. B. Trubshaw. At only 28, Ernest Brian Trubshaw is a veteran of the air. In 1948 he left the King's Flight. He flew the Workshop Viking on its South African Tour, joined the staff of the Empire Flying School and, finally, went to Vickers-Armstrongs as a test pilot in 1950. Again and again, in the course of his career, pilot Trubshaw has relied on the benefits of the Shell and BP Aviation Service. He says: "I have always found the Shell and BP Aviation Service most efficient and helpful."



Shell and BP Aviation Service

Since the time when pilots flew by "dead reckoning" and the "seats of their pants", the sight of a Shell and BP refuelling truck on the tarmac below has been a welcome one. Even more so today. Both the men who make aircraft and the pilots who fly them, have learnt to depend on the Shell and BP Aviation Service to handle the problems of fuelling and of lubricating specifications with speed and efficiency. You'll find it's the same, every time — almost everywhere in the United Kingdom.

SHELL-MEX AND B.P. LTD.,
Shell-Mex House, Strand, London, W.C.2
Distributors in the United Kingdom for the Shell and Anglo-Iranian Oil Groups



Rotary Actuators

ENGLISH ELECTRIC actuators will operate at temperatures of −60°C, also in tropical and high altitude conditions. All types are irreversible and their robust design enables them to be run on to their stops without damage. They meet the requirements of all prevailing specifications.

The illustration shows a type 200 series rotary actuator applied to a fuel cock. Actuators to suit most types of valves and cocks are available.

Linear actuators are also supplied.

Publications describing these actuators are available and will be sent, on request.

Exhibiting at the Paris Aero Show
STAND No. 6

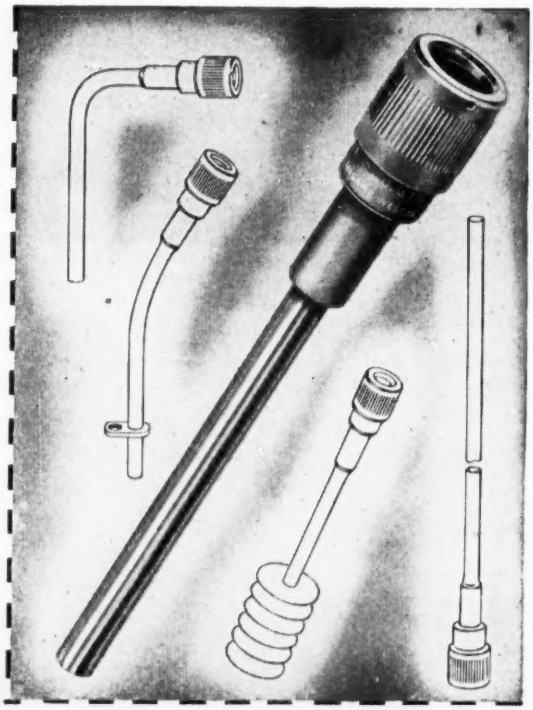
ENGLISH ELECTRIC
aircraft electrical equipment

THE ENGLISH ELECTRIC COMPANY LIMITED, QUEENS HOUSE, KINGSWAY, LONDON, W.C.2
Aircraft Electrical Equipment Department, Bradford
WORKS: STAFFORD . PRESTON . RUGBY . BRADFORD . LIVERPOOL . ACCRINGTON

AE.1

Weston Resistance Bulbs

The Model S.110 Platinum Resistance Bulb, used in conjunction with a Weston circular scale indicator is greatly superior in every respect to other methods of temperature measurement. Its platinum element is the most stable, accurate and the smallest yet produced for practical applications. Due to the very small size of the resistance element, the response time is extremely rapid. Reliability and long life are ensured by the fact that the element is hermetically sealed into a ¼" o/dia. stainless steel sheath which is fitted with a watertight plug connection. The socket is moulded integrally with special cable which is supplied. The Model S.110 is suitable for temperatures between −200°C. and +500°C.
Full details of Weston equipment for aircraft will gladly be supplied on request.



WESTON
AIRCRAFT INSTRUMENTS

SANGAMO WESTON LIMITED
ENFIELD **MIDDLESEX**
Tel: Enfield 3434 (6 lines) 1242 (4 lines) *Grams: Sanwest, Enfield*
Scottish Factory: Port Glasgow, Renfrewshire
Branches. Glasgow, Manchester, Newcastle-on-Tyne, Leeds, Liverpool, Wolverhampton, Nottingham, Bristol, Southampton, Brighton

NAVAL ENTOMOLOGY: Twelve Westland Sikorsky Dragonflies leading the huge stream of Fairey Fireflies in the flypast during the recent Review of the Fleet at Spithead.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News

The Duke Flies a Devon

ACCOMPANIED by his instructor, F/L. C. R. Gordon, the Duke of Edinburgh flew an R.A.F. Devon from White Waltham last Friday. This is the fourth type the Duke has flown since he started his flying training with the R.A.F.

R.A.F.S.A.A. Bisley Meeting

ON the final day of the R.A.F. Small Arms Association's meeting at Bisley last week, the Chief of the Air Staff, Air Chief Marshal Sir William F. Dickson, was present together with the Vice and Deputy Chiefs of the Air Staff and a number of Command Commanders-in-Chief. A.V-M. F. C. Halahan, who helped to found the association in 1921, and was its chairman for 21 years, was there and was presented with a silver salver in appreciation of his work. G/C. G. E. Watt is the present chairman.

At the prize-giving ceremony it was announced that the Queen, who is the patron of the association, had presented a Queen's Medal for future competition.

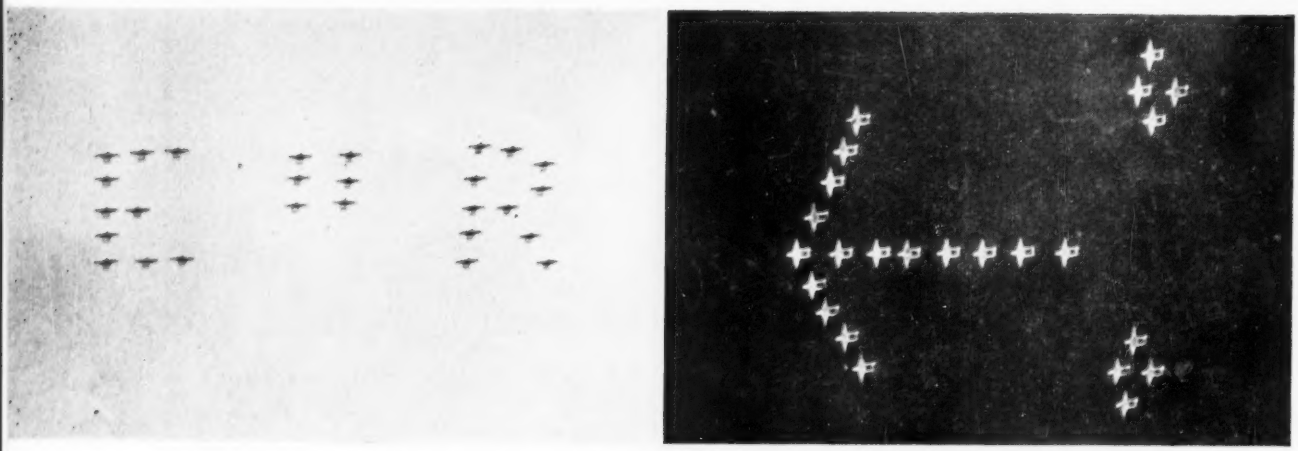
The winners of the main events were: *Rifle Championship S.R. (a):* 1st, Sen. Tech. J. Witts, Stafford (352); 2nd, S/L. C. C. Williott, H.Q. Unit, Tech. Training Command (348); 3rd, Sen. Tech. Breislin, Coningsby (345). *Revolver Championship:* 1st, W/C. R. F. B. Guy, Air Ministry (194); 2nd, S/L. C. C. Willott, H.Q. Unit, Tech. Training Command (193); 3rd, Cpl. Creasey, Gutersloh (191). *Rothermere Shield:* 1st, Maintenance Command (6,065); 2nd, Tech. Training Command (6,031); 3rd, Flying Training Command (6,005). *Light Machine-gun Match:* 1st, No. 19 Squadron, Church Fenton (155); 2nd, Locking "B" Team (145). *Command Rifle Team Match S.R. (a):* 1st, Maintenance Command (1,322); 2nd, Tech. Training Command (1,303); 3rd, Fighter Command (1,258). *Station Rifle Team Match S.R. (a):* 1st, Locking (1,254); 2nd, R.A.F. College Cranwell (1,238); 3rd, Air Ministry (1,221). *Squadron Rifle Team Match S.R. (a):* 1st, No. 63 Squadron (625); 2nd, No. 116 Squadron (581). *Command Rifle Team Match S.R. (b):* 1st, Fighter Command (1,088); 2nd, Coastal Command (1,084); 3rd, Flying Training Command (1,081). *Station Rifle Team Match S.R. (b):* 1st, Calshot "A" Team (551); 2nd, Melksham "A" Team (545). *Command Revolver Team Match:* 1st, Flying Training Command (653); 2nd, Technical Training Command (635). *Station Revolver Team Match:* 1st, H.Q. Tech. Training Command, Brampton Grange (325); 2nd, R.A.F. College Cranwell (319); 3rd, Shinfield Park (309). *Young Officers' and Airmen's Challenge Cup:* 1st, Flt. Cdt. Biddiscombe, Cranwell (173); 2nd, Cpl. Creasey, Gutersloh (172); 3rd, P/O. Pitel, Leeming (169). *Combat Snapshooting Team Match S.R. (a):* 1st, St. Athan "B" team, time—64 sec, remaining targets—nil, unexpended rounds, 23; 2nd, Henlow, time—68 sec, remaining targets—nil, unexpended rounds, 20. *Long Range Match:* 1st, P/O. Boustred, Watton (134); 2nd, F/L. Clarke, Edzell (133); 3rd, S/L. Young, Henlow (130).

R.C.A.F. Comet No. 2

AFTER flying from London *via* Iceland and Labrador the second of the two de Havilland Comet 1As purchased by the Royal Canadian Air Force has arrived in Ottawa. The 3,550-mile delivery flight was completed in a total elapsed time of 14 hr, of which 9 hr 23 min was flying time. This is one hour less than the time taken by the first R.C.A.F. Comet, which experienced strong headwinds. The second aircraft carried two complete flight crews, under S/L. Roland Lloyd, and 19 passengers—17 members of the R.C.A.F. Comet unit and two D.H. representatives.

AT BISLEY: (Top left) Air Chief Marshal Sir William F. Dickson—who presented the prizes—with Marshal of the R.A.F. Lord Tedder. (Top right) Sen. Tech. J. Witts chaired after winning the R.A.F. rifle championship. (Bottom left) The Maintenance Command team with some of their many trophies. (Bottom right) The scene at the butts during the final Command rifle team matches.

"Flight" photograph.



CANAL ZONE COMPLIMENT: The Vampire Wing led by W/C. "Buck" Courtney, D.F.C., fly perfect E ii R and arrowhead formations at Deversoir during the Coronation display. The difference in sky colour is caused photographically, not meteorologically.

SERVICE AVIATION . . .

The Queen's Appointments

IT has been announced that H.M. the Queen, on the occasion of her Coronation, has been pleased to assume appointments as Air Commodore-in-Chief of the Royal Auxiliary Air Force, the Royal Air Force Regiment and the Royal Observer Corps.

These appointments were held by King George VI but have been in abeyance since his death. In his appointment as Air Commodore-in-Chief of the Air Training Corps he was succeeded by H.R.H. the Duke of Edinburgh.

The three appointments as Honorary Air Commodore of the City of Edinburgh R.Aux.A.F. squadrons, which the Queen accepted while she was Princess Elizabeth, are being retained by her.

R.A.A.F. in Royal Review

AUSTRALIA'S representation at the Royal Review at Odiham on July 15th will be by No 78 Fighter Wing, based at Malta. Eighteen pilots and 85 ground crew have already arrived in Britain and are stationed at Horsham St. Faith. The pilots flew their 16 Vampires and two Meteor 7s to Britain, making one stop in France. Twelve Australian Vampires will fly during the review.

M.E.A.F. Coronation Celebrations

THE high spot of the Coronation celebrations in the Canal Zone, was the R.A.F. air display at Deversoir, which was attended by 15,000 servicemen and their families. The two-hour show included individual and formation aerobatics, an air race, paratroop and supply dropping, demonstrations by the R.A.F. Regiment and a set piece with mortar, rocket and bombing attacks in the best Hendon display style. Air Marshal Sir Arthur P. M. Sanders, A.O.C-in-C. M.E.A.F., was present with General Sir Cameron Nicholson, C.-in-C M.E.L.F.

Britannia Shield

TEAMS of competitors for the Britannia Shield are expected to arrive on October 1st for the competitions which will take place between October 5th and 7th. On October 6th the finals of the fencing will be held at R.A.F. Station Uxbridge and those of the swimming events at Eltham Baths, London, S.E. Finals of the shooting and boxing will be contested the next day at Bisley and the Empire Pool, Wembley, respectively.

Flood Awards

FURTHER to the list published in our issue of June 5th, the following awards have been given for services during the East Coast floods early this year. *O.B.E.*—W/C. P. H. Baldwin and S/L. J. A. Theophilus. *M.B.E.*—F/L. R. V. H. Haley, B.E.M. and F/L. J. E. Smith. *Queen's Commendation for Valuable Service in the Air.*—F/L. A. G. Smith.

Royal Review Programmes

THE R.A.F. Benevolent Fund has been entrusted by the Air Council to publish the programme for the Royal Review of the Royal Air Force at Odiham. This will be a welcome source of revenue.

When making the announcement recently that the R.A.F. Benevolent Fund has spent no less than £166,308 to help 6,152 cases during the first three months of this year, the fund's controller, A.V-M. Sir John Cordingley, pointed out that the income for the same period has fallen short of expenditure by more than £35,000.

Income from all sources during 1952 was £248,199, which was £101,423 less than the previous year; this sum is less than six months' expenditure.

No. 216 Maintenance Unit Badge

AT a recent ceremony held at Sutton Coldfield, Warwickshire, the Lord Lieutenant of the County, A. Cdre. Lord Willoughby de Broke, M.C., A.F.C., J.P., presented No. 216 Maintenance Unit with its new badge. It was received by W/C. M. W. Newell, who commands the unit, and G/C. J. W. Hunt, C.B.E., represented the A.O.C. No. 40 Group.

The crest of the badge incorporates the arms of the royal town of Sutton Coldfield and underneath is the motto "Prepared."

Air Signallers' Tie

A TIE has been designed for wear by personnel, including cadets, who have served on the posted strength of No. 1 Air Signallers School, R.A.F. Swanton Morley, Norfolk, since May 1st, 1951. The tie, which has the unit badge woven on a dark blue background with diagonal stripes of lighter blue, is in two qualities, 13s 6d and 19s 6d. It is available from Gieves, Ltd., 27 Old Bond Street, London, W.1 or from the Admin. Wing Adjutant at Swanton Morley.

Reunion

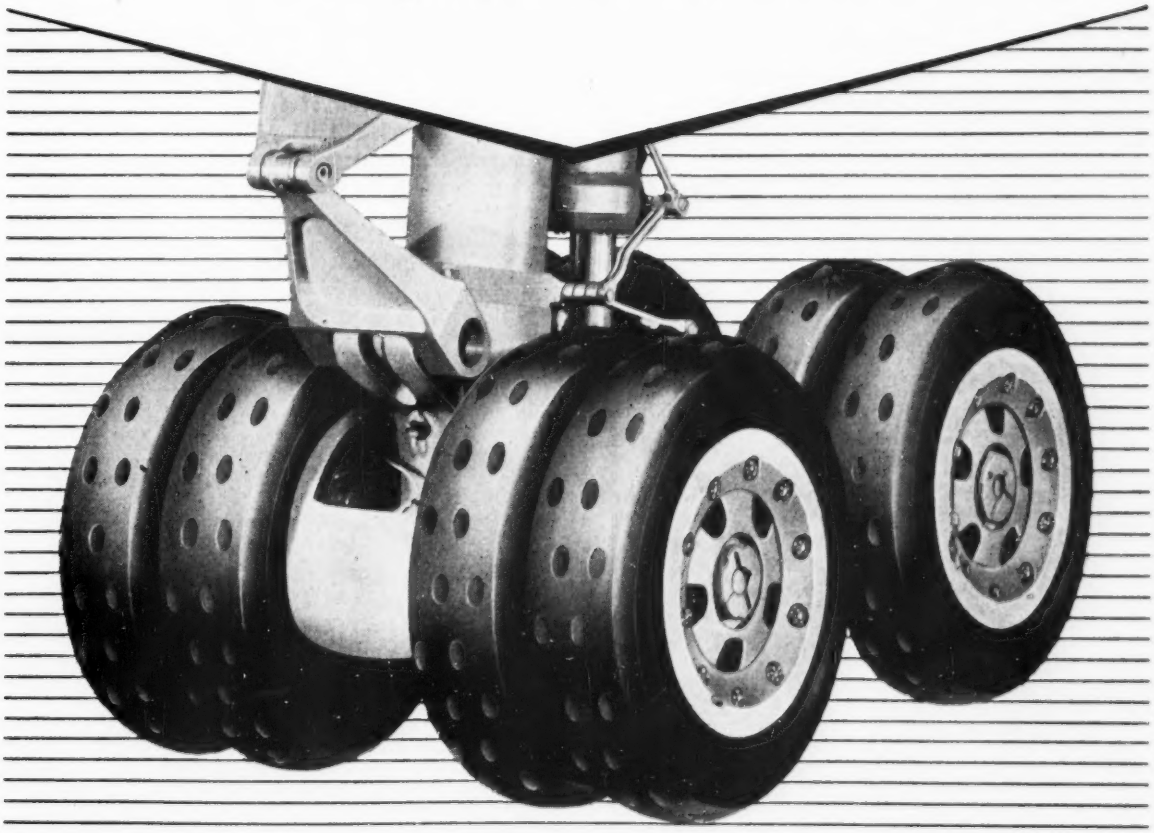
AT the Old Kimmul Club, 11, Burleigh Street, Strand, London, W.C.2, No. 92 (F) Squadron is holding a reunion on July 11th next. Will ex-members contact S/L. G. R. Turner, R.A.F. Linton-on-Ouse, Yorkshire. Telephone number Linton-on-Ouse 261, ex. 73.

AT THE DEVERSOIR DISPLAY: (Left) Mr. R. Hankey, the new British Chargé d'Affaires in Cairo and A.V-M. H. V. Satterley, A.O.C. No. 205 Group watching the flying. (Right) Naval visitors to Deversoir find the Meteor 7 in the static park to be of more than passing interest.

DUNLOP

Serves the Aircraft Industry

with Tyres, Wheels and Brakes



★ SEE DUNLOP AT THE PARIS SHOW

DUNLOP RUBBER COMPANY LIMITED (AVIATION DIVISION) · FOLESHILL · COVENTRY

ULTRA
introduce
SARAH

THE COMPLETE SYSTEM FOR SEARCH AND RESCUE AND HOMING OF DISTRESSED AIRMEN

The Royal Air Force have adopted this system as standard equipment for the rapid location and rescue of distressed airmen on land or sea. Ultra SARAH is causing World-wide interest.

SARAH

is being demonstrated

AT THE 20e
SALON
INTERNATIONAL
DE L'AERONAUTIQUE
PARIS

ULTRA ELECTRIC LIMITED,
WESTERN AVENUE, ACTON, LONDON, W.3

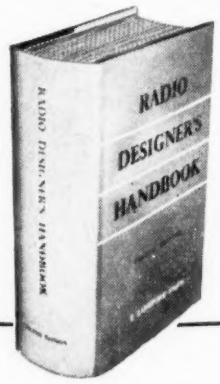
PRESERVATION
PRE-PACKING
EXPORT PACKING
SHIPPING and
INSURANCE

A Comprehensive Service for the Aircraft and Allied Industries

*

Take your Packing and Shipping Problems to:—

R. & J. PARK LTD.
DOMINION WORKS
THAMES ROAD, CHISWICK, W.4
Tel.: CHIswick 7761. Cables: Park, Domin.



A much enlarged edition of a most valuable reference book

Radio Designer's Handbook

Edited by F. Langford-Smith, B.Sc., B.E., Senior Member I.R.E. (U.S.A.), A.M.I.E.(Aust.)

4th Edition. A comprehensive reference book, the work of 10 authors and 23 collaborating engineers, containing a vast amount of data in a readily accessible form. The book is intended especially for those interested in the design and application of radio receivers or audio amplifiers. Television radio transmission and industrial electronics have been excluded in order to limit the work to a reasonable size.

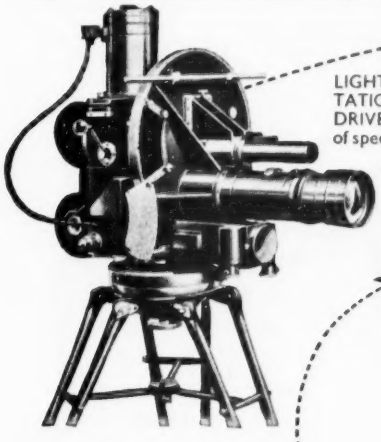
This book must not be distributed to Australia, New Zealand or the Americas.

8¾" × 5½" Over 1,500 pp. **42s net** *By Post 43s 6d*

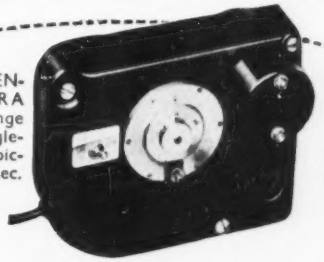
Published by "Wireless World"

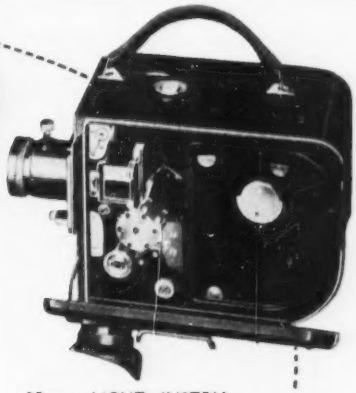
From booksellers or from:—DORSET HOUSE, STAMFORD ST., LONDON S.E.1

THE TUNGUM COMPANY LIMITED, Brandon House, Painswick Road, Cheltenham, Glos.



LIGHT INSTRUMENTATION CAMERA DRIVE with a range of speeds from single-shot to 48 pictures per sec.



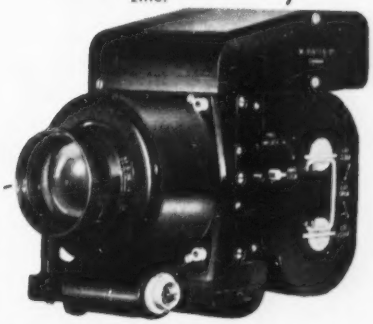


35mm LIGHT INSTRUMENTATION CAMERA with 200ft capacity Magazine.

CINE - CAMERAS for RESEARCH RECONNAISSANCE and RECORDING

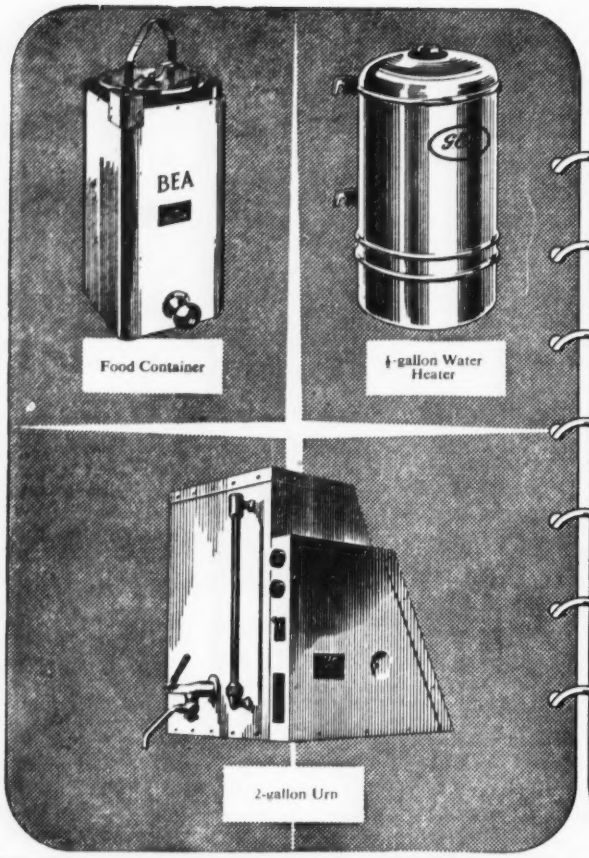
70mm TAKE-OFF CAMERA for recording the flight-path of aircraft etc.

Vinten



70mm LOW ALTITUDE RECONNAISSANCE CAMERA with exposures at 4 and 8 pictures per sec.

W. VINTEN LTD., NORTH CIRCULAR ROAD, CRICKLEWOOD, N.W.2. Tel.: GLAdstone 6373



ELECTRICAL
EQUIPMENT
IN THE
VICKERS "VISCOUNT"

FOOD CONTAINERS,
WATER HEATERS,
URN, Etc.

Pirelli-General "Pren" cable is also used on the "Viscount" for wiring systems.

G.E.C.

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

There are no finer springs than Springs by Riley

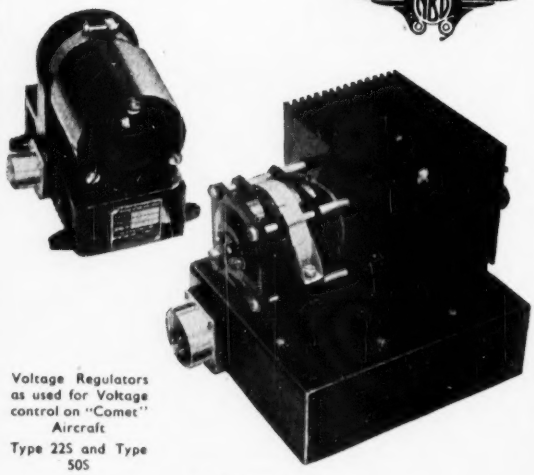
RR
FAMOUS FOR SPRINGS SINCE 1821

ROBERT RILEY LTD., MILKSTONE SPRING WORKS, ROCHDALE

Phone: Rochdale 2231 (5 lines)
Grams: "Rilospring" Rochdale

NEWTON-DERBY

NBD



Voltage Regulators as used for Voltage control on "Comet" Aircraft
Type 22S and Type 50S

AUTOMATIC
VOLTAGE REGULATORS

Also makers of Rotary Transformers and Anode Convertors, Wind- and Engine-driven Aircraft Generators, High-frequency Alternators and High-tension D.C. Generators

ELECTRICAL PLANT SPECIALISTS

SBAC

NEWTON BROTHERS (DERBY) LIMITED

HEAD OFFICE & WORKS: ALVASTON ROAD, DERBY
TELEPHONE: DERBY 45611 (3 LINES) TELEGRAMS: DYNAMO, DERBY
LONDON OFFICE: IMPERIAL BUILDINGS, 56 KINGSWAY

for all ANGULAR drives...

UNIVERSAL JOINTS

. . . provide the most efficient compact and powerful answer

ME Joints are manufactured under ideal conditions, by specially designed single purpose plant. Rigid inspection of components is made after each operation, and heat treatments are scientifically controlled.

Catalogue on request.

THE MOLLART ENGINEERING CO. LTD.

KINGSTON BY-PASS - SURBITON - SURREY
Phone: ELMbridge 3352-3-4 Telegrams: Precision, Surbiton
AIR MINISTRY GAUGE TEST HOUSE AUTHORITY
89755/31

'ME' PATENT UNIVERSAL BALL JOINT

Combines high load carrying capacity, simplicity of design and utmost reliability. 92%—98% efficient (N.P.L. certified).

HOOKE'S TYPE UNIVERSAL JOINT

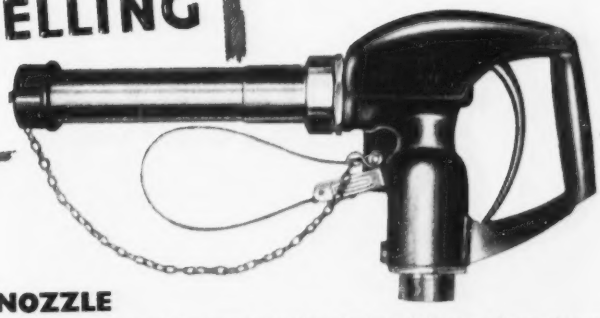
Suitable for high speeds. Inexpensive to fit and needs no telescoping sleeves. Will stand some tension and compression loads.

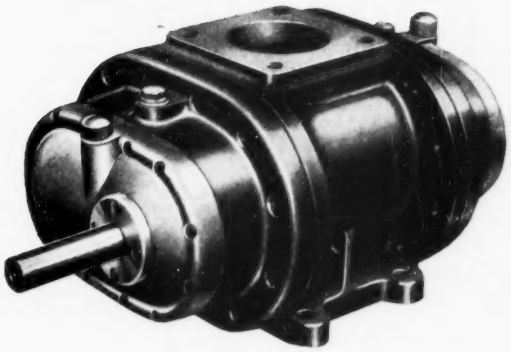
HOOKE'S TYPE LIGHT SERIES **UNIVERSAL JOINT**

Designed for light duty. Moderate tension and compression loads are allowable.

Protect for life with 'ME' Grease Retaining Covers
Available for all types and sizes of joints

ZWICKY AIRCRAFT RE-FUELLING EQUIPMENT...





NOZZLE

The importance of the nozzle to the efficient delivery of petrol and other fluids has led Zwicky technicians to give special attention to it. Our range includes both trigger operated and automatic cut-off types, for all rates of flow up to 100 gals. per minute.

ROTOR PUMP

Important features: Positive displacement — Double helical gears — High volumetric and mechanical efficiencies — Non-pulsating — All bearings running in oil bath — 6 sizes from 15 to 600 gals. per minute.

Zwicky Ltd., Trading Estate, Slough, Bucks.

TELEPHONE: SLOUGH 24481/2/3

POWER AND HAND PUMPS, MICRON FILTERS, PATENT HOSE REELS, SPECIALISTS IN PUMPING AND FILTERING EQUIPMENT.

2,000 AMP AIRCRAFT STARTING and SERVICING UNITS

SELF-PROPELLED
AND/OR
TRAILERS

ELECTRICAL ENGINEERING CONSTRUCTION CO. LTD.

TOTNES DEVON ENGLAND

Telegrams: REDEVON TOTNES Telephone: TOTNES 3282

WATER WASHABLE

Offkwik

NON-INFLAMMABLE

PAINT REMOVER

The most economical and efficient paint remover in the world

PAINT REMOVERS LTD

24, Ryder St. St. James, London, S.W.1. TRAfalgar 4161 (7 lines)

MAKE IT A *Jubilee*

Coronation Year

Famous in Four Reigns

L. ROBINSON & CO. (GILLINGHAM) LTD.
London Chambers, GILLINGHAM, KENT. Phone 5282

THE LINK BETWEEN...

As Joe the milkman guides his electric float up the main village street, maybe he sometimes envies the pilots of the great airliners that constantly pass overhead on their way to every part of the globe. Yet, although he may not know it, there is a link between him and the men whose job he covets. All over the country, milkmen such as Joe rely upon the dependability of Oldham batteries to keep their floats and prams on the move, just as aircraft operators both at home and overseas rely upon Oldham Aircraft Batteries to give the highest possible power output for the lowest possible overall weight.

OLDHAM

POWER TO SPARE

AIRCRAFT BATTERIES

OLDHAM & SON LTD · DENTON · MANCHESTER · EST. 1865

ELECTRIC EQUIPMENT

by

B T-H

is installed on the

COMET

JET-PROPELLED AIR-LINERS

BTH designed, developed and supplied the complete electric power system

BTH EQUIPMENT IS INSTALLED ON MANY OTHER WELL-KNOWN ·· AIRCRAFT ··

THE
BRITISH THOMSON-HOUSTON
COMPANY LIMITED, COVENTRY, ENGLAND

Member of the AEI group of companies A4498N

RUMBOLD

THE OLD ESTABLISHED AIRCRAFT FURNISHING SPECIALISTS

Adjustable High Density Treble Seats as fitted to Discovery Class Viscount Aircraft of B.E.A.

• • • • • • • • • •

Single and Double Versions can also be supplied (forward or aft facing)

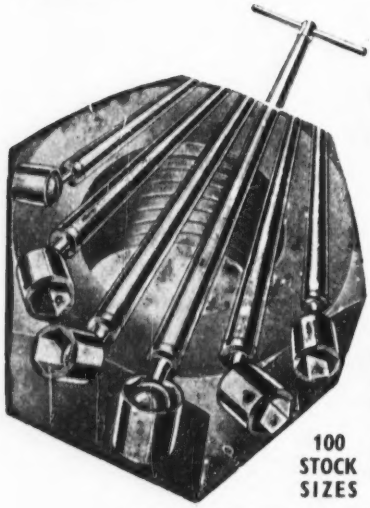
L. A. RUMBOLD & Co. LTD., KILBURN, LONDON, N.W.6

TELEPHONE: MAIDA VALE 7366-7-8

Leytool

UNIVERSALLY JOINTED
SOCKET SPANNERS
For
ASSEMBLY and MAINTENANCE
OF JET AND TURBINE ENGINES

•



100 STOCK SIZES

Originally devised for war-time service on aero engines. Manufactured to close limits of accuracy. Moving parts of specially hardened alloy steel.

Write for fully descriptive leaflet and complete catalogue of "Leytool" Hand Tools

THE LEYTONSTONE JIG & TOOL CO., LTD.

LEYTOOL WORKS, HIGH ROAD, LEYTON, LONDON, E.10 *Phone: Leytonstone 5022-3*

---

for Jet Engines—

Stainless Steel Stiffening Bands for Jet Pipes

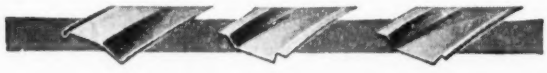
As supplied to Rolls-Royce Ltd. for Gas Turbine Engines. Our latest production methods save valuable material and reduce costs.

EQUATOR WHEELS & SECTIONS LTD.

RAGLAN STREET WOLVERHAMPTON

Grams: Section A.I.D. APPROVED *Tel.: 21605/6*

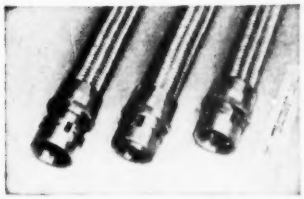
Specialists in Cold Rolling, Forming and Coiling for the Aircraft Trade



AVICA

EQUIPMENT

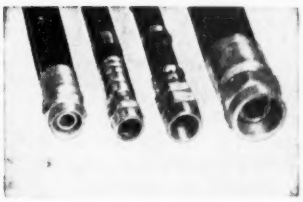
USED BY THE LEADING AIRFRAME AND ENGINE MANUFACTURERS FOR BRITAIN'S FRONT LINE AIRCRAFT



LIGHT WEIGHT ALL STAINLESS STEEL FLEXIBLE PIPE ASSEMBLIES

For extremes of operating temperature, a wide size range covers such systems as:—

- Cabin and fuel tank pressurization
- Fuel and lubricating oil
- Electrical Harness
- Fuel vent and drain
- Gun and camera heating and de-icing
- Rocket Fuel and oxident

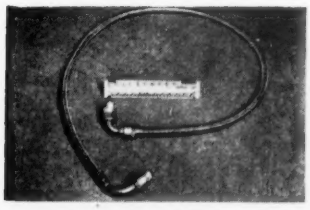


FLEXIBLE SYNTHETIC RUBBER HOSE ASSEMBLIES

for all aircraft fuel, oil, air, instrument and hydraulic systems operating within a temperature range of —40° C. to +160° C.

SUPPORT CLAMPS

for flexible and rigid supply lines and electric cable runs. Produced to 'AS' standards or special requirements in both fireproof and standard types.



ELECTRICAL HARNESS

For Gas Turbines and Piston Engines, including conduit and complete low tension and high energy ignition systems.

Full details on our range of equipment can be obtained from

AVICA **EQUIPMENT LIMITED**

1, ADAMS PLACE, HOLLOWAY RD., LONDON, N.7

Tel.: NORth 4281. Cables: CORPAVIA, LONDON

Represented in France by

SOCIÉTÉ WORLDMARKET ET CIE,
19, RUE DU 4 SEPTEMBRE, PARIS (2e)

Tel.: RIC 65-90.

TYPE APPROVED

ULTRA

are exhibiting their

GAS TURBINE AND TURBO-PROP ENGINE ELECTRIC CONTROLLER SYSTEMS

specially designed for and approved by:

ARMSTRONG SIDDELEY

BRISTOL

DE HAVILLAND

AT THE 20e
SALON INTERNATIONAL
DE L'AERONAUTIQUE
PARIS

ULTRA ELECTRIC LIMITED
WESTERN AVENUE, ACTON, LONDON, W.3

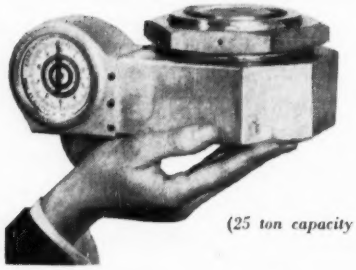
Series 231 In line Solenoid

One of our range of Solenoids from ⅛" to 3" B.S.P. Other models up to 4,000 p.s.i 24v. D.C. Send for leaflets of our full range of reducing valves and pressure controllers, acid valve etc.

ON/OFF WORKING PRESSURE
1,500 p.s.i. GAS OR LIQUIDS
FULL BORE

I.V. PRESSURE CONTROLLERS LTD
FORGE WORKS, 844, BATH ROAD
CRANFORD, MIDDLESEX Phone HAYES 2809-1203

The
B.O.A.C. HYDROSTATIC WEIGHING UNIT



(25 ton capacity unit illustrated)

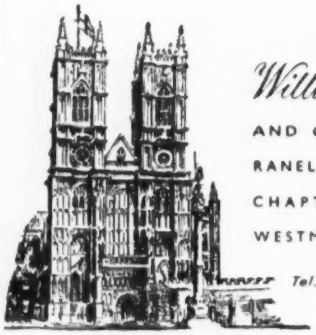
- ACCURATE
- PORTABLE
- RELIABLE

ALL ENQUIRIES TO THE SOLE DISTRIBUTORS
KENTON EQUIPMENT Ltd.
708, KENTON ROAD, KENTON, HARROW, MIDDLESEX
WORdsworth 7805 (5 lines)
Manufactured by ALLTOOLS LTD. GT. WEST ROAD, BRENTFORD, MIDDLESEX.

SUGG WESTMINSTER

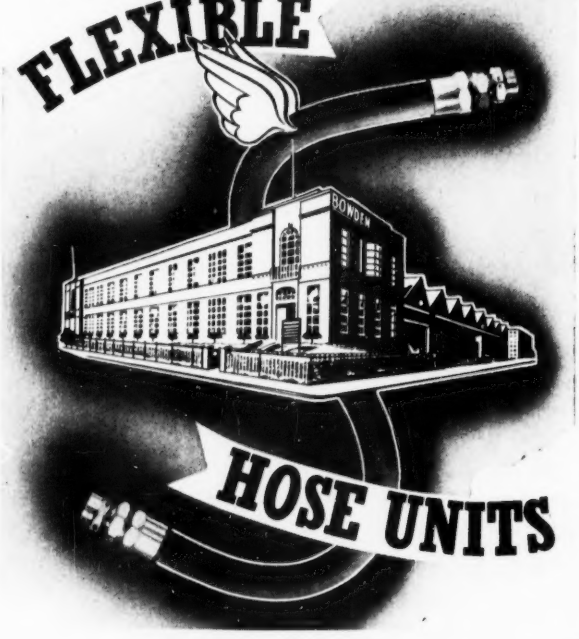
Engineers to the Aircraft Industry

A.I.D. APPROVED



William Sugg
AND CO., LIMITED
RANELAGH WORKS
CHAPTER STREET
WESTMINSTER, S.W.1
Tel. VIC 3211

Bowdenflex
FLEXIBLE HOSE UNITS



FLEXIBLE PIPE DIVISION
BOWDEN (ENGINEERS) LTD
WILLESDEN JUNCTION, LONDON, N.W.10

FLIGHT and AIRCRAFT ENGINEER

PRESS DAY — *Classified advertisement "copy" should reach Head Office by* FIRST POST THURSDAY *for publication in the following week's issue subject to space being available.*

CLASSIFIED ADVERTISEMENTS

Advertisement Rates. 4/- per line, minimum 8/-, average line contains 6-7 words. Special rates for Auctions, Contracts, Patents, Legal and Official Notices, Public Announcements, Tenders 5/- per line, minimum 10/-. Each paragraph is charged separately, name and address must be counted. All advertisements must be strictly prepaid and should be addressed to FLIGHT Classified Advertisement Dept., Dorset House, Stamford Street, London, S.E.1.

Postal Orders and cheques sent in payment for advertisements should be made payable to Iliffe & Sons, Ltd., and crossed & Co.

Trade Advertisers who use these columns regularly are allowed a discount of 5% for 13, 10% for 26 and 15% for 52 consecutive insertion orders. Full particulars will be sent on application.

Box Numbers. For the convenience of private advertisers, Box Number facilities are available at an additional charge for 2 words plus 1/- extra to defray the cost of registration and postage, which must be added to the advertisement charge. Replies should be addressed to "Box 0000, c/o Flight," Dorset House, Stamford Street, London, S.E.1.

The Publishers retain the right to refuse or withdraw advertisements at their discretion and do not accept liability for delay in publication or for clerical or printer's errors although every care is taken to avoid mistakes.

Situations Vacant. The engagement of persons answering these advertisements must be made through the local office of the Ministry of Labour and National Service etc. if the applicant is a man aged 18-64 or a woman aged 18-59 inclusive, unless he or she or the employer is excepted from the provisions of The Notification of Vacancies Order 1952.

DOWTY EQUIPMENT LIMITED

require first class sound

PRACTICAL ENGINEERS

preferably with some experience of design, development and testing of jet engine accessories, particularly flow, acceleration and speed governing controls, burners and pumps. Exceptional prospects of advancement.

SENIOR DRAUGHTSMEN

required for development work on fuel systems. Experience on light hydraulic or pneumatic controls acceptable.

SENIOR DRAUGHTSMEN

for hydraulic and undercarriage department also required.

STRESSMEN

Important positions with prospects.

The Company's conditions are exceptionally good. There is a realistic pension scheme and the environment is ideal.

The Company employs a Housing Officer who will render every assistance.

Write, preferably in tabulated form, to PERSONNEL MANAGER,

DOWTY EQUIPMENT LTD.
CHELTENHAM

Directional Gyros 6A/1209
Artificial Horizons 6A/1498

New Instruments. Low Prices.

MUIR & ADIE LTD.

Croydon Airport, Surrey, England
'Grams: Muirair, Croydon. 'Phone: CRO 7744

COTTON BAGS

FOR SPARE PARTS, ETC.

WALTER H. FELTHAM & SON, LTD.

Imperial Works, Tower Bridge Road,
Telephone: HOP 1784 **LONDON, S.E.1**

AIRCRAFT FOR SALE

W. S. SHACKLETON, LTD.

Calling Australia!
Calling Australia!!
Calling Australia!!!

WE have pleasure in announcing that

Aviation Servicing, Ltd.

who have purchased a large number

Vickers Viking Mark IB

aircraft from British European Airways, have given us the sole selling rights in Australia for these excellent post-war 27-38 passenger aircraft which have given such wonderful service with B.E.A.
They compare more than favourably with Dakotas in cruising speed (210 m.p.h.), cost per passenger mile, and engine life between overhauls (1,200 hours.)
W. S. Shackleton, Ltd., also have pleasure in announcing that we have been invited by the world-famous firm of HENLYS, LTD.
Europe's Leading Automobile Distributors
to assist in the sale of their mechanical handling and transport equipment in the BRITISH AIRCRAFT INDUSTRY
where we have so many clients and friends. Demonstrations and advice will be given gladly and without obligation. The equipment includes:—
BRUSH INDUSTRIAL TRUCKS
WRIGLEY MOTOR TRUCKS
WRIGLEY FORK-LIFT TRUCKS
TRAILERS
GIRAFFE ELEVATORS
ZEPHYR CONVEYORS, etc. . . .
W. S. Shackleton, Ltd., now have pleasure in offering for sale a unique Rapide the only one in the world with Gipsy Queen II engines and de Havilland constant speed propellers (as used on all marks of Percival Proctor aircraft). Spare engines and propellers are readily available at low prices. Offers wanted.
£???? RAPIDE with Queen II engine and de Havilland constant speed propellers. This aeroplane will outperform any standard Rapide and has real single-engine performance. Engine hours only 12 since new. Airframe 1,800 since new. Certificate of Airworthiness until September, 1953. Airframe one of the last batch constructed. Fitted Ekco 2-channel V.H.F. S.B.A. heater. Long-range fuel tanks. 6 cabin seats—the ideal machine for extended touring and executive use.
W. S. SHACKLETON LTD., 175, Piccadilly, London, W.1. Tel.: REGent 2448-2449. Cables: "Shackhud, London." [0070

AEROSERVICES (LONDON), LTD.

Offer the following excellent aircraft:—

de Havilland Dove

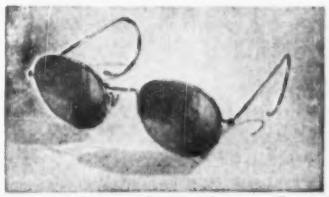
8-SEATER with zero time engines, propellers and airframe since complete overhaul. For early delivery at the attractive inclusive price—ex base, tanks empty—of £13,000.

Airspeed Consul

6-SEATER with Certificate of Airworthiness valid for 12 months. Radio equipment includes MR.60 and STR.1617. Engines since complete overhaul, starboard 546 hours, port 67 hours.
OTHER aircraft available include:—
TIGER MOTHS and PROCTORS
WRITE, telephone, or call:—
CROYDON AIRPORT,
ENGLAND.
Tel.: CROydon 8833.
Cables: "Aeropaul, Croydon."
[0940

AVIRAD, Ltd.

LOCKHEED Lodestars, PBY5A amphibious Catalinas and Avro XIX aircraft available for immediate delivery. Also spares and equipment for all types of aircraft and engines.
AVIRAD, Ltd., Croydon Airport, Surrey. Tel.: Croydon 7744. Cables: Avirad, Croydon. [0500



Spectacles. Anti-glare, R. A. F. Mk. VIII as shown above, **complete in strong case. 21/-**

Flying Helmets **KHAKI DRILL** Summer weight, suitable for electrical or acoustic type intercom sets. **25/-** each

Gosport Tubes suitable for the above helmets. **24/3**

Terms to Flying Clubs. Trade Supplied
Send 3d. in stamps for illustrated catalogue.

D. LEWIS LTD. (DEPT F.)
Leather Clothing Manufacturers for Home or Export
124 GT. PORTLAND ST., LONDON, W.1
Tel.: Museum 4314 Grams: Aviakit, Wesdo, London

WOLVERHAMPTON AVIATION LTD.

THE LEADING LIGHT AIRCRAFT ENGINEERS

THE AIRPORT, WOLVERHAMPTON
Telephone: Fordhouses 2228

We have the following Aircraft for sale

Immediate Delivery

GEMINI 1A with Radio fitted.
MESSENGER, Cirrus Major III—Dual Control.
AUSTER J4. Low Hours — Dual Control.
TIGER MOTH. PIPER CUBS (2).
PROCTOR V's (2) Low Hours.
AUSTER AUTOCRAT £750.

Spares available for Messenger and Gemini. Dual flying Controls Messenger and Gemini. Long-range Fuel Tank, Auster, complete.

LONDON OFFICE: Telephone: ABBEY 2345
78, BUCKINGHAM GATE, S.W.1.

AIRCRAFT SPRING WASHERS

TO B.S. SPECIFICATION S.P.47

CROSS MFG. (1938) LTD., COMBE DOWN, BATH

AIRCRAFT FOR SALE

R.
K.
DUNDAS, Ltd., offer:

NORTH AMERICAN AT6 aircraft in quantity, completely overhauled and fitted with nil-houred 1340 AN1 engines and Hamilton 12D40-211 propellers. SCR 522 V.H.F. radio is installed. The delivery period from date of firm contract would be two aircraft in the first 60 days, followed by one per week consecutively. For further information of these and many other aircraft, apply to:—

R.
K.
DUNDAS, Ltd.,

29 Bury Street, St. James's, London, S.W.1. Cables: "Dundasaero, London."
CROYDON Airport: Tel. CRO. 7744. Cables: "Dundasaero, Croydon." [0559
AEROVAN with C. of A. and large quantity of spares, price open to offer.
£375 Auster IV.
£250 Tiger Moth, in good condition.
FULL details from Vendair, Croydon Airport, Croydon 5777. [0603
MESSENGER, Gipsy Major engine, fitted radio, current C. of A.—Monro, White Lodge, Lancing 3091. [9785
CONSUL aircraft for sale. Very fully equipped. £1,500.—Full details from Air Enterprises, Ltd., Croydon Airport, Surrey. Tel.: Croydon 7744, ex. 130. [9768
MILES Magister; 10 months C. of A. to run; 550 hours on engine since complete overhaul. Finished red and silver. Full dual control and electric intercom. Price £325.
TIGER MOTH, with C. of A. expiring end of August, 1953; 528 hours on engine since complete overhaul. Price £265.
TIGER MOTH; C. of A. expired June this year; 1,136 hours on engine since complete overhaul. £215.
HANTS AND SUSSEX AVIATION, Airport, Portsmouth. [8793
DAKOTAS, passenger and freight, full C. of A. reasonable price. Anson and Whitney Straight also Pratt and Whitney engines, apply: Starways, Ltd., Speke Airport, Liverpool 19. [9778

AIRCRAFT WANTED

WANTED: Miles Gemini. Reply stating engine hours. John Macpherson, 19 Harley Crescent, Harrow, Middx. [9772
OUR demand for good used aircraft of all descriptions is very great. Operators or owners wishing to dispose of aircraft, engines, or anything aeronautical, are asked to communicate at once to:—
R. K. DUNDAS, Ltd., 29 Bury Street, London, S.W.1.
WHI. 2848. Cables: "Dundasaero, Piccy, London."
CROYDON AIRPORT. CRO. 7744. [0558

AIRCRAFT SERVICING

BROOKLANDS AVIATION, Ltd., Brooklands Aerodrome, Weybridge. C. of A. overhauls, modifications and conversions. Tel.: Byfleet 436. [0305
REPAIRS and C. of A. overhaul for all types of aircraft.—Brooklands Aviation, Ltd., Civil Repair Service, Sywell Aerodrome, Northampton. Tel.: Moulton 3218. [0307
CERTIFIED crack detection by Magna Flux of aircraft parts. Prompt services; reasonable charges.—C. and S. Aircraft, Blackbushe Airport, Camberley 1600 (Extn. 307). [0310

AIRCRAFT ACCESSORIES AND ENGINES

AIRCRAFT bulbs and landing lamps, British and American. Fuses, U.S. gyro instruments, cabin heaters. A large variety of other aircraft material.
SUPLEX LAMPS, Ltd., 239, High Holborn, W.C.1. Tel. No.: HOLborn 0225. [9775
MARCONI AD.97/108 equipment, three sets, less voltage regulator, Type 925. Recently removed from our Dove aircraft. We would be interested in receiving offers.
WRITE: Chief Engineer, Cambrian Air Services, Cardiff Airport. [9716

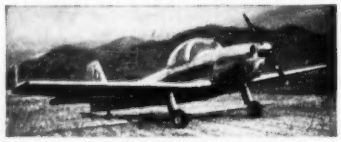
AIRCRAFT ACCESSORIES AND ENGINES WANTED

WANTED: R.2600 engines.
AVIRAD, Ltd., Croydon Airport. [9761

AEROCONTACTS
LIMITED

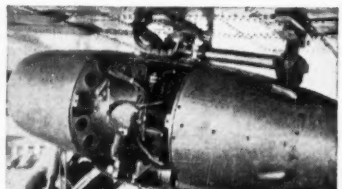
British Commonwealth Agents and Concessionaires for
PIAGGIO & C,
manufacturing the P.136L Feeder-line and executive light twin-engine amphibian

and the P.148 fully aerobatic all-metal Trainer and Touring Aircraft



ALSO
we are British Commonwealth Agents and Concessionaires for the
Societe Nationale de Constructions Aeronautiques du Sud Ouest
manufacturing the
S.O.30P "BRETAGNE" 43-seat 1,000-mile range pressurized airliner

and for their PALAS BOOSTER UNIT, which augments the safety factor and single-engine performance of twin-engine transport aircraft



EXHIBITING AT PARIS INTERNATIONAL SALON, June-July, 1953

CAPACITY AVAILABLE

CAPACITY now available for press tools, jigs and fixtures, also jig boring.—Industrial Tooling Units, 23a, Wrotham Road, N.W.1. GUL. 2880. [9714
AIRCRAFT plugs and sockets, 5D/. . . series, and A.G.S. parts. Pressings in all metals up to 60 tons. Precision machining of small components. Light electrical and mechanical assemblies. All finishes. Press tools manufactured in our own tool-room. A.I.D. and A.R.B. approved. Advice and estimates given free. Inquiries to:—
METAL COMPONENTS, Ltd., Dolphin Road, Shoreham, Sussex. Tel.: Shoreham-by-Sea 2224/5. [9750

CARAVANS

You're always at Home

WHEREVER your work takes you, when you own an F.O.C. Caravan.
No more high rents to pay—
No more dictatorial landladies—
FOR a moderate investment you and your family enjoy complete independence, radiant health, more leisure, and real happiness. Thirty caravans on display under cover, including good slightly used models. Credit facilities confidentially arranged. Main line trains met. Caravan Hire Fleet—Tariff on request. Main distributors for ECCLES.
SEND for your free copy of latest illustrated booklets from:—

F.O.C. CARAVAN CENTRE,

200/220, CRICKLEWOOD BROADWAY, LONDON N.W.2.
Tel.: GLAdstone 2234. Open Weekdays 8 to 7.
Sundays 11 to 4 [9774

NEW "Statesman," £1,065. Other Berkeleys from £399/10/-. New Glider 4-berth de luxe, £399/10/-, and 2-berth, £212. Safari, £368. Towing. Hire purchase.—Mantles Garages, Ltd., Biggleswade. Tel. 2113. [0367

CLOTHING

R.A.F. and R.N. officers' uniforms purchased; large selection of R.A.F. officers' kits for sale, new and reconditioned.—Fisher's Service Outfitters, 85-88 Wellington St., Woolwich. Tel.: Woolwich 1055. [0567

CLUBS

REDHILL FLYING CLUB.
LEARN to fly at Redhill Aerodrome, Surrey, South London's nearest flying centre, 23 miles from Hyde Park Corner, £3/10/- per hour dual; from £2/10/- solo; instrument flying, instructors' and advanced courses. Attractive clubhouse with full catering facilities.—Tel.: Nutfield Ridge 2245. [0347
LONDONERS! Your most accessible and reasonable flying club. M.C.A. approved. Austers, 45/- hour, trial lesson 17/6.—Phone Penguin Flying Club, Victoria 1300. [0285
HERTS and ESSEX AERO CLUB, Broxbourne Aerodrome, Nazeing, Essex. M.C.A. approved 30-hour course; residential; trial lessons, 35/-; train from Liverpool Street, or Green Line Coach 715. Tel.: Hoddesdon 2453, 2421. [0230

CONSULTANTS

GROUP CAPT. E. L. MOLE, B.Sc., A.F.R.Ae.S., 31 Dover St., London W.1. Gro. 5902. [0400
WING COMMANDER R. H. STOCKEN, F.R.Ae.S., Eagle House, 109 Jermyn St., London S.W.1. Tel.: Whitehall 8863. [0419

INSTRUMENT OVERHAUL

A. J. W. (INSTRUMENTS), Ltd.
WHILST we are completing a contract for Farnborough, finishing off a batch of some couple of hundred instruments for one government, well stuck into several hundred for another and blithely taking on another hundred or so for a third, we can still cope. Mark you, we also cater for aircraft manufacturers, airlines, charter companies and agents so our workshops can be said to be busy. Do not let this deter you, for after all, you too can enjoy our standard of workmanship.
INCIDENTALLY, if you happen to be a trained instrument worker we could probably use your services, particularly if you are related to the Octopus family.
A. J. W. (INSTRUMENTS), Ltd., Gatwick Airport, Horley, Surrey. Horley 1510. Ext. 38 and 105. [0268

MISCELLANEOUS

STEEL buildings from stock, 50ft, 60ft, 80ft, or 100ft clear span.—Bellmans, Terminal House, S.W.1. Sloane 5259. [9717

HENLYS

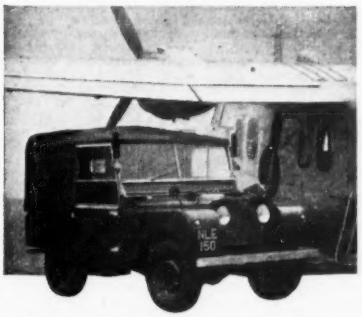
England's Leading Motor Agents

AVIATION INDUSTRIES DEPARTMENT

Henly House, 385 Euston Rd, London, N.W.1

(Euston 4444)

THE ROVER DISTRIBUTORS



offer another Specialist Vehicle

THE **LAND-ROVER**

FOR:—

- AIRCRAFT TOWING
- BOWSER TOWING
- CARAVAN TOWING
- FIRE FIGHTING
- GRASS CUTTING
- HIGH PRESSURE PUMPING
- STATION WAGON
- TENDER (HIGH SPEED)
- UTILITY *and can be used for anything from A to Z including* YOUR PERSONAL CAR

NO PURCHASE TAX
IMMEDIATE DELIVERY!
(Deferred Terms if Required)

Cut out and post to HENLYS Aviation Industries Department *(address as above)*

I am interested in acquiring a new Land-Rover.

I have for Part Exchange:

Make..... H.P.....

First reg..... Mileage.....

Body Style .....

Name.....

ADDRESS .....

.....

.....

Telephone .....

(No obligation whatsoever involved)

MISCELLANEOUS

SURFACE grinders. New Eagle, 18in by 6in, motorised 1 h.p., single- or three-phase, from £135.—Victa Engineering Co., Maidenhead. Tel. 50. [8792

STEEL lattice and guyed radio masts, 100ft high, for sale. Delivery from stock. Excellent condition.—Bellmans, Terminal House, S.W.1. [9718

12 PAIRS B.O.A.C. type Aircraft Seats for sale, fully adjustable; cost £75 pair; new and unused; £15 pair as a complete lot.—Apply: 25 Cadewell Lane, Torquay. [9782

DRAWING office accommodation available on Kingston bypass (near Surbiton). Three rooms, each about 1,500 sq. ft. clear space. Also general offices. Ample transport.—Apply Box 7953. [9787

PACKING AND SHIPPING

R. AND J. PARKS, Ltd., 143-9 Fenchurch St., E.C. Tel.: Mansion House 3083. Official packers and shippers to the aircraft industry. [0012

PRECISION packing of aircraft, aircraft components. The packing of aircraft, aircraft components and most other costly or delicate machinery for storage or shipment abroad is best carried out by Export Packing Service, Ltd. With four packing centres, road, rail and shipping facilities, a designs and development section unique in the industry, complete mass-production facilities from sawmills to printing and labelling plant, and a progressive approach to all packing questions, they are well equipped to deal with any manufacturer's packing problem, however complex or great in scope.
EXPORT PACKING SERVICE, Ltd., Imperial Buildings, 56 Kingsway, W.C.2. Tel.: Chancery 5121/2/3. [0920

PHOTOGRAPHY

AEROPLANE photographs, large selection 1914-18 aircraft, military and civil, including the latest American and British jets, 5½ in by 3in, 6s. per dozen. Send 1s. for lists and specimen. Real Photographs Co., Ltd., Victoria House, Southport. [9789

PUBLIC ANNOUNCEMENTS

AIR TRANSPORT ADVISORY COUNCIL

THE Air Transport Advisory Council give notice that they have received the undermentioned applications to operate scheduled air services:

Application No. 160 (revised) from Eagle Aviation, Ltd., of 29, Clarges Street, London W.1, for an all-freight service initially with Dakota aircraft but later with more modern types, for the carriage of freight on the route London-Birmingham-Dusseldorf or Frankfurt-Copenhagen-Stavanger-Oslo-Stockholm-Gothenburg-Copenhagen-Dusseldorf or Frankfurt-Birmingham-London, at a frequency of one to three services weekly during a 10-year period ending March 31st, 1963.

Application No. 197 from British Overseas Airways Corporation, of Airways House, Great West Road, Brentford, Middlesex, for a normal scheduled service initially with Constellation aircraft and later with Bristol Britannia aircraft, for the carriage of passengers, supplementary freight and mail between London and Trinidad, with intermediate traffic stops at Prestwick, Bermuda and Barbados at an initial frequency of one service weekly, varying with traffic demand, during the period from October 1st, 1953 to September 30th, 1960.

THESE applications will be considered by the Council under the terms of reference issued to them by the Minister of Civil Aviation on July 30th, 1952. Any representations or objections with regard to these applications must be made in writing stating the reasons and must reach the Council within 14 days of the date of this advertisement, addressed to the Secretary, Air Transport Advisory Council, 9 Buckingham Gate, London, S.W.1, from whom further details of the applications may be obtained. When an objection is made to an application by another air transport company on the grounds that they are applying to operate the route or part of route in question, their application, if not already submitted to the Council, must reach them within the period allowed for the making of representations or objections. [9788

TIME RECORDERS

STAFF item checking and job-casting time recorders (all makes) for quick cash sale; exceptional condition. —Box 7241. [0040

TUITION

TWIN CONVERSIONS

GEMINI aircraft, fitted radio, £6 per hour, dual or solo.—Southend Flying School, Essex, Rochford 56204. [0333

A.F.R.Ae.S., A.R.B.Certs., A.M.I.Mech.E., etc., on "no pass no fee" terms; over 95 per cent successes. For details of exams and courses in all branches of aeronautical work, navigation, mechanical eng., write for 144-page handbook, free.—B.I.E.T. (Dept. 702), 17 Stratford Place, London W.1. [0707

SHORT BROTHERS & HARLAND LIMITED

REQUIRE

design office staff

for work of high importance

in Belfast

* * *

Senior and Intermediate

Aircraft Design

Draughtsmen and Stressmen

Men with light engineering

experience may also apply

* * *

Those wishing to settle down in this part of the country are assured of positions which are permanent and pensionable together with excellent opportunities for promotion

Spacious and modern offices in pleasant surroundings and adequate transport facilities

Arrangements are available for prospective employees to visit Belfast and survey the living conditions

Details of modern housing will be supplied at interview

Salaries commensurate with ability and experience

Applications should be addressed to:

THE PERSONNEL MANAGER

SHORT BROTHERS & HARLAND LIMITED

QUEENS ISLAND · BELFAST

TUITION

AVIGATION, LTD.

The Safe Guidance and Handling of Aircraft in the Air)

THE foremost College in the United Kingdom for correspondence courses and direct tuition for private, professional pilot's and navigator's licences up to I.C.A.O. standards, as implemented by the Ministry of Civil Aviation.

FOR advice or advancement in a civil aviation career, apply to:—

AVIGATION, LTD.

30 CENTRAL CHAMBERS,
EALING BROADWAY, W.5
(EALing 8949).

[0248

LONDON SCHOOL OF AIR NAVIGATION.

UNDER our personal coaching methods, which are unsurpassed, your chances of success are of a very high order indeed. In the Senior qualifications we obtained 60 per cent of the total passes at the official examinations. Those sponsored by us for the Junior qualifications have achieved a 95 per cent pass at first sitting.

OUR new "Home Study" courses compiled in an up-to-date manner are the only ones which give full coverage to the syllabii, in conformity with current examination conditions. Presented in an attractive manner, on the Lesson, Question and Specimen Answer basis, they are the best solution to those who wish to enter the profession or seek higher licences, but unable to attend the classrooms.

ALL Link practices with briefing and R/T; A.R.B. Type Ratings—General/Specific; Consul Instrument Flying (shared); also "refresher." This is the only integrated training within the London area. By co-ordinating all your requirements under our direction, it is the most economical and efficient. We offer consultation without obligation.

33 Ovington Square, Knightsbridge, London, S.W.3. Kensington 8221. [0277

AIR SERVICE TRAINING OF HAMBLE provides training in all branches of aviation in their flying, navigation, radio and engineering schools.

DETAILS of the numerous ab initio and conversion courses available will be forwarded on application to the Commandant, Air Service Training, Ltd., Hamble, Southampton. [0970

MATHEMATICS, physics coached privately in your own home by qualified teachers. Harrow Tutors, Harrow 1720. [9771

LEARN to fly for £24; instructors' licences and instrument flying for £3 per hour; night flying £3/10/- an hour; residence 5 gns. weekly. Approved M.C.A. private pilot's licence course.—Wiltshire School of Flying, Ltd., Thruxton Aerodrome, Andover, Hants. [0253

FREE! Brochure giving details of courses in all branches aero eng., covering A.F.R.Ae.S., A.R.B. Certs., M.C.A. exams., etc. We are the only postal training college operated by an industrial organization. —Write to E.M.I. Institutes, Postal Division, Dept. F.26, 43 Grove Park Rd., London W.4. (Associated with H.M.V.) [0926

LEARN to glide. The Bristol Gliding Club are again running holiday gliding courses each week from June to September inclusive. Instruction in two-seater gliders is provided. All flying, temporary club membership, hotel accommodation and meals included in the comprehensive charge of 12½ gns.—Further details from Hon. Course Secretary, 63 Sefton Park Road, Bristol 7. [9588

AERONAUTICAL. Comprehensive full-time technical and practical training for careers in all branches of aviation engineering. Diploma course leads to interesting executive appointments in civil aviation, design and development, draughtsmanship, maintenance, etc. Extended courses to prepare for A.F.R.Ae.S. and A.M.I.Mech.E. examinations.—Write for prospectus to Engineer-in-Charge, College of Aeronautical Engineering, Chelsea, London S.W.3. Flaxman 0021. [0019

SOUTHEND-ON-SEA MUNICIPAL FLYING SCHOOL, Essex. Phone: Rochford 56204. Comprehensive training for private, commercial licences and instructor's endorsements. M.C.A. approved for 30-hour course. Tiger Moth and Auster aircraft. Special facilities for training in instrument ratings and radio procedure. Hourly rates: Solo £3, dual £3/5/-, contract rate £2/10/-. No entrance fee or subscription. Trial lesson 30/-. [0332

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through the local office of the Ministry of Labour and National Service, etc., if the applicant is a man aged 18-64 or a woman aged 18-59 inclusive, unless he or she or the employer is excepted from the provisions of The Notification of Vacancies Order 1952.

GUIDED MISSILE RESEARCH AND DEVELOPMENT

DEVELOPMENT engineers required on guided missile hydro-mechanical devices with particular reference to control mechanisms. Laboratory assistants also required as testers for hydraulic pumps, motors, etc. —Apply in confidence to Box AC82565, Samson Clarks, 57-61 Mortimer Street, W.1. [0933

SHORT BROTHERS & HARLAND LIMITED

REQUIRE

design office staff

for work of high importance

in their new offices in

the central London area

near main line terminus

* * *

Senior and Intermediate

Aircraft Design

Draughtsmen and Stressmen

Men with light engineering

experience may also apply

* * *

These positions are

permanent and pensionable

Salaries will be commensurate

with ability and experience

Excellent opportunities

for promotion in all spheres

Applications should be addressed to:

THE PERSONNEL MANAGER

SHORT BROTHERS & HARLAND LIMITED

QUEENS ISLAND · BELFAST

SITUATIONS VACANT

COMMONWEALTH OF AUSTRALIA

Senior Test Pilot

APPLICATIONS are invited from suitably qualified and experienced persons for the position of senior test pilot, Government Aircraft Factories, Melbourne, Victoria.

SALARY range: £A1,808 to £A1,994 (actual) per annum, including current cost-of-living allowance at the rate of £A192 per annum and flying allowance at the rate of £A250 per annum.

DUTIES: Flight testing of experimental prototype new production and repaired turbo-jet and reciprocating-engined aircraft.

QUALIFICATIONS:

(a) Holder of, or eligible for, current Australian or English Commercial Pilot's Licence.
(b) Satisfactory completion of an Empire Test Pilot's course or qualifications of a similar nature.
(c) Minimum flying experience of 2000 hours in Command.
(d) Flying experience on a minimum of 12 types of aircraft, including at least 400 hours on twin- or multi-engined aircraft.
(e) At least 500 hours' test-flying experience.
(f) Satisfactory experience in the flying of jet-propelled aircraft.
(g) Experience in a series of performance and handling tests on at least one prototype aircraft.
(h) Applicants must be British subjects and medically fit to undertake high-altitude flights.

THE successful applicant will be eligible for permanent appointment to the Commonwealth Public Service. Subject to specified conditions, first-class boat fares (if first-class berths available) of the appointee and dependents (wife and dependent children) will be paid by the Commonwealth.

FURTHER details of the position and conditions of employment may be obtained from the addresses hereunder:—

APPLICATION forms may be obtained from:—

The Senior Representative (A.P.1),
DEPARTMENTS OF DEFENCE PRODUCTION AND SUPPLY,
AUSTRALIA HOUSE,
STRAND, LONDON, W.C.2,
and should be lodged by 3rd July, 1953. [8791

THE ENGLISH ELECTRIC CO., LTD.

Luton.

have the following vacancies:—

★ ★ ★

SENIOR designer required for structural or airframe section of Guided Weapon Design Office. This man will be required to work on the production design of an accepted principle and applicants with both aircraft and/or motor industry experience will be considered as most suitable. Ordinary or Higher National Certificate desirable.

★ ★ ★

SECTION leader required for mechanical installation of components in guided weapons. Past experience of similar work or aircraft power plants essential. Preference given to those applicants with National Certificate or considerable aircraft design office experience.

★ ★ ★

SENIOR and intermediate draughtsmen required for mechanical installation section. Previous experience in aircraft installation office desirable.

★ ★ ★

SENIOR and intermediate draughtsmen required on the electrical side of the installation section to handle wiring diagrams and the mounting of electronic equipment. Past electrical experience essential, but additional aircraft experience will be to the applicant's advantage.

★ ★ ★

DRAUGHTSMEN for modification section of guided weapon design office to handle all aspects of routing change procedure and the preparation of major assembly drawings. Applications from men in the upper age bracket will be welcomed.

★ ★ ★

SENIOR illustrator required for technical publication section. Ability to work from engineering drawings essential. Past experience of lettering will be an additional asset.

★ ★ ★

ALL these posts offer considerable scope for advancement in an expanding organisation.—Address all replies to Dept. C.P.S., 336/7 Strand, W.C.2, quoting Ref. SA26A. [9748

HUNTING AIR TRANSPORT

require

Pilots

immediately with A.L.T.P., I.R. and R.T. licences with Dakota or Viking experience.
ADEQUATE FOR EARLY COMMAND.
[8794

LICENSED radio engineer and radio mechanics at our base at Stansted Airport, Essex.—Apply by letter or telephone to the Senior Radio Engineer, Aviation Traders, Ltd., Southend Airport, Essex. Tel.: Rochford 56491. [0950

SITUATIONS VACANT

Aircraft Division

of

AIR SERVICE TRAINING, HAMBLE, HANTS,

have vacancies on their design office staff for
SENIOR AND JUNIOR DRAUGHTSMEN
with experience on aircraft structures, electrics and general services.
FULL-SCALE LAYOUT DRAUGHTSMEN, STRESSMEN.

THERE is an interesting programme of work on aircraft of high priority. Salaries will be commensurate with ability and experience.

ASSISTANCE with accommodation will be given as far as possible to all suitable applicants who are accepted after a reasonable probationary period.

APPLY to the Personnel Manager, Air Service Training, Ltd., Hamble, Southampton, Hants, or the nearest office of the Ministry of Labour and National Service. [9737

THE DE HAVILLAND AIRCRAFT Co., Ltd., Airspeed Division, Christchurch, Hants, have vacancies for the following staff:—

UNIVERSAL millers, turners, detail fitters, assembly fitters, experimental fitters and ratefixers (machine shop and detail fitting).

WRITE, giving details of experience, age, etc., to the Personnel Manager of the above firm. [9770

SENIOR aircraft structural draughtsman and senior or intermediate stressman required.—Apply to Portsmouth Aviation, Ltd., Building No. 300, Bournemouth (Hurn) Airport, nr. Christchurch, Hants. [9767

AIRCRAFT or mechanical draughtsmen required, all grades.—Apply, stating age, experience and salary required to the Chief Draughtsman, Alan Muntz and Co., Ltd., Aircraft Division, Langley Aerodrome, Slough, Bucks. [0368

HANDLEY PAGE (Reading) Ltd., the Aerodrome, Woodley, Reading, require the services of experienced senior, intermediate and junior weightsmen for work on an interesting new project. Please send full particulars to the Personnel Officer. [0235

TECHNICAL illustrator required, aged 23 or over, with considerable practical experience.—Applications in writing to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Beds., stating age, experience and salary required. [0593

STARWAYS, Ltd., Liverpool Airport, require Dakota Captain, B.A.L.P.A. rates and conditions, also Radio Engineer, Licence preferred but not essential, able to carry out installations as fitted to Dakota aircraft. [9756

SENIOR and intermediate design draughtsmen with good experience of aircraft or light structural or mechanical engineering, required for aircraft and armament project work.—Apply by letter to Portsmouth Aviation, Ltd., The Airport, Portsmouth. [9631

THE DERBYSHIRE AND LANCASHIRE GLIDING CLUB require a full-time ground engineer. Salary according to qualifications and experience.—Apply to C. L. Faulkner, Staden Manor, Buxton, Derbyshire. [9781

HELICOPTER pilots, ground engineers and fitters required for Antarctic whaling operations. Licences not essential; training offer to suitable applicants.—Write full details age, experience, licences (if any) to Air Whaling, Ltd., 202 Bishopsgate, London E.C.2. [9757

AIRCRAFT radio mechanics skilled in workshop practice or aircraft installations to work at Stansted Airport, Essex. Hostel accommodation available. Minimum hourly rates, 3s. 9d.—Write to the Personnel Manager, Skyways of London, 7, Berkeley Street, W.1. [0290

JIG and tool draughtsmen, fully experienced, required by Percival Aircraft, Ltd., Luton Airport, Beds. Good working conditions and full welfare facilities, including staff pension scheme.—Applications to the Personnel Manager, stating age, experience, salary required. [0600

STRESSMEN-DESIGNERS offered up to £900 per annum. Degree standard with minimum five years' stressing experience on interesting project in expanding office in well-known South of England firm. Please send full particulars to Box AC.80348, Samson Clarks, 57-61 Mortimer Street, London W.1. [0931

STRESS and weights engineers with aircraft experience are required by The English Electric Co., Ltd., Aircraft Division, Warton Aerodrome, near Blackpool. Salaries commensurate with experience. Apply, giving full details and quoting ref. 314F to C.P.S. Dept., 336 Strand, London W.C.2. [9719

H. M. HOBSON, Ltd., Fordhouses, Wolverhampton, require technical assistants for research and development work on fuel metering and hydraulic servo systems for aircraft, and interesting new projects. Applicants should be up to degree standard in engineering.—Apply, stating age, experience and salary required. [9765

ENGLISH ELECTRIC have vacancies for aircraft draughtsmen at Warton Aerodrome, near Blackpool. Men with good aircraft drawing office experience are invited to apply for these interesting positions which carry good salaries.—Write, giving full details, quoting ref. 120-T, to C.P.S. Dept., 336 Strand, London W.C.2. [9720

THE DE HAVILLAND AIRCRAFT COMPANY, Ltd., Airspeed Division, Christchurch, Hants, have vacancies for Ratefixers for the Machine Shop and Detail and Fitting Shops. Applications in writing to the Personnel Manager of the above Firm giving previous experience, etc. Only experienced persons need apply. [9760

H. M. HOBSON, Ltd., invite applications for positions in the drawing office as follows: designers, detail and modification draughtsmen, checkers, stressmen. The work is concerned with interesting projects connected with fuel metering equipment and hydraulic flying controls for aircraft.—Hobson Works, Fordhouses, Wolverhampton. [0420

FLIGHT engineer required by Field's of Nottingham Airport base. "O" licence Dakota essential, "A" and/or "C" preferable addition. Selected candidate will be responsible for flight test gang doing flight ground checks following overhaul and subsequent flight testing.—Apply to Personnel Officer, Field's of Croydon Airport, Surrey. [9783

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT, Ltd., Baginton, Coventry, have vacancies for drawing office and allied personnel who have the ability to write reports from drawings, specifications and physical examination of equipment. Good payment and interesting work. Successful applicants will be given opportunity to develop into technical authors. [9736

H. M. HOBSON, Ltd., Fordhouses, Wolverhampton, require draughtsmen for their Technical Department. The work will be of a varied and interesting nature on test rigs and test equipment required for the development of new projects on hydraulic equipment and fuel control systems.—Apply, stating age, experience and salary required. [9746

GRADUATE engineer/physicist required for work on heat-flow problems and structures connected with guided weapons, with good theoretical and experimental background. Permanent progressive post. Salary according to experience.—Apply to Dept. C.P.S., The English Electric Co., Ltd., 336/7 Strand, W.C.2, quoting Ref. 1140. [9747

APPLICATIONS are invited from senior and intermediate design draughtsmen. Experience of aero-engine design desirable, but not essential. Also checkers.—Please write, stating age, and giving details of previous experience in chronological order, to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [0930

REQUIRED immediately by Percival Aircraft, Ltd., Luton Airport, Beds, several draughtsmen with comprehensive experience of engine installations and allied systems. Good welfare facilities, including staff pension scheme.—Applications in writing, stating age, qualifications, experience and salary required to the Personnel Manager. [0601

TEST laboratory assistants (male) required by Percival Aircraft, Ltd., Luton Airport, Beds. National Certificate standard and previous experience on design of test laboratory equipment desirable. Good welfare facilities including staff pension scheme.—Applications, stating qualifications, experience, age and salary required, to Personnel Manager. [0596

NORMALAIR, Ltd., have vacancies for design and detail draughtsmen in their London office for work on aircraft pressurization, air-conditioning and high-altitude breathing equipment.—Applications, stating age, experience and salary required, should be addressed to the Personnel Officer, Normalair, Ltd., Yeovil, Somerset. [9742

AIR FORCE, Naval, civil and helicopter aircraft all under design and development at Percival Aircraft, Ltd., Luton Airport, Beds. Applications are invited from senior and junior draughtsmen and stressmen for work on this interesting programme. Good welfare facilities, including staff pension scheme.—Write, giving details of experience and salary required, to Personnel Manager. [0595

APPLICATIONS are invited from design draughtsmen and stressmen, also technical assistants with combined design and performance experience for work on both reciprocating and gas turbine aero engines.—Applications should state full particulars of experience and qualifications and should be addressed to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [0932

ARMSTRONG SIDDELEY MOTORS, Coventry, have vacancies for a number of designers and senior and junior draughtsmen. Although gas turbine experience is most advantageous, it is not necessarily essential as training will be given in this specialized work to suitably qualified draughtsmen.—Apply, in detail, to Reference F.103, Personnel Manager, Armstrong Siddeley Motors, Coventry. [0200

★ **GROUND** ★
STARTING EQUIPMENT
Ex Stock—Heavy Duty Trolliac Cables.
Immediate Delivery. **15ft—£8 0 0**
Trolliac Plugs—*British*—**£6 10 0**
U.S.A./British—
2/3 Way Adaptors—£7 10 0

Staravia
BLACKBUSHE AIRPORT
CAMBERLEY, SURREY
Tel.: Camberley 1600

BRITISH EUROPEAN AIRWAYS require instructors at Northolt to instruct on engines, airframes and electrical subjects. Five years' aircraft maintenance experience with engineering apprenticeship, or equivalent; knowledge to "A," "C" or "X" licence standard. Salary scale £570 to £785 per annum. Written applications to Personnel Officer, Flight Operations Dept., B.E.A., Keyline House, Ruislip, Middlesex. [9779

CHIEF engineer required to take over technical control and be responsible for A.I.D. inspection of an instrument laboratory engaged in the overhaul of aircraft instruments. Applicants should have the necessary technical qualifications and experience of a large variety of aircraft instruments, including electrical instruments. Some design experience is desirable.—Apply by letter, in the first place, to: Managing Director, Wynstruments, Ltd., Staverton Aerodrome, Gloucester. [9726

SENIOR and junior technical assistants required for the stress office. H.N.C. or honours degree in mathematics or engineering. Inquiries are invited from experienced technicians and those who wish to enter a technical office. Modern factory, good working conditions. Salary will depend upon qualifications and experience.—Send for application form to Chief Stressman, Electro-Hydraulics, Ltd., Warrington, Lancs. [9729

WIND tunnel technical assistants required, preferably with experience on low speed and transonic wind tunnels. Candidates must have had a recognised academic course and obtained a qualifying degree or diploma with aerodynamics as one of the subjects. Applications, stating full particulars of experience, qualifications, age, etc., should be sent to the Labour Manager, A. V. Roe and Co., Limited, Greengate, Middleton, Manchester. [9786

A LEADING aircraft company requires a chief production engineer to take complete charge of ratefixing, planning, progress and jig and tool design. It is essential that the applicant has had experience in a similar capacity, and he would be responsible to the general manager. A substantial salary will be paid to selected applicant. Replies, in strictest confidence, should state full details of past record, salaries and positions held.—Write: Box F.440, c/o 191 Gresham House E.C.2. [9780

A. V. ROE AND CO., Ltd., have a vacancy for a workshop instructor (fitter) in their apprentice training school. Applicants should have served a full apprenticeship with some technical training and be capable of giving instruction in general fitting shop practice, they should also have a knowledge of machining. Previous experience as an instructor and of youth organisation work are considered desirable and candidates should be between 25-45 years of age. Applications, stating age, qualifications, experience, also salary required, to the Labour Manager, A. V. Roe and Co., Ltd., Greengate, Middleton, Manchester. [9777

MINISTRY OF SUPPLY requires scientific officers and senior S.O's for project assessment groups at R.A.E., Farnborough, Hants. and at London Headquarters. Quals.: 1st or 2nd class Hons. degree or equivalent in physics, maths., or eng., and, for the senior grade, at least 3 years' post-graduate research experience. A taste for broad assessment work leading to selection of aircraft and other equipment for military and civilian use desirable; some practical design experience an advantage. Salary within ranges: S.S.O. (min. age 26) £812-£1,022 (London); £781-£980 (provincial), or S.O. £440-£707 (London); £417-£675 (provincial). Women somewhat less. Posts unestablished. F.S.S.U. benefits may be available. Application forms from M.L.N.S., Technical and Scientific Register (K), 26 King Street, London, S.W.1, quoting A161/53/A. [9773

SITUATIONS WANTED

PILOT, 1,130 hrs. commercial. R/T, joy-riding, aerial work, ferry. Part or full.—Box No. 7912. [9776

PHOTOGRAPHER. Ex-chief photographer of leading S.A. magazine, at present managing large photo-copying and dyeline printing firm in South Africa, seeks interesting employment with U.K. aircraft manufacturer. 32 years old, married. War-time S.A. Air Force navigator.—Box 7952. [9784

WANTED

WANTED, Dennison (U.S.A.) hydraulic test trollies, with Wisconsin V.4 air-cooled engines or electric motor drive. Dimensions approx. 4ft by 3ft by 4ft. On rubber-tyred wheels. As sold at Burtonwood or Taunton.

ADVERTISING MANAGER, Staravia, Blackbushe Airport, Camberley, Surrey. [8790

BOOKS, ETC.

"CELESTIAL Navigation for Yachtsmen." 2nd Edition. By M. Blewitt. This little book, intended especially for beginners, should receive a very warm welcome from every yachtsman who has wanted to learn the art of navigation by the heavenly bodies, but has been deterred by its apparent complexity. In particular, it will make an immediate appeal to all who feel their mathematics are not up to standard, for neither geometry nor trigonometry play any part in the author's explanation—indeed, even those who can manage little more than addition and subtraction should master this book with ease! 62 pages. Illustrated with 26 diagrams and graphs. Price 5s. net. By post 5s. 3d. from all booksellers, or the Publishing Dept., Dorset House, Stamford St., London, S.E.1.

BOOKS, ETC.

"FELLOWSHIP of the Air: Jubilee Book of the Royal Aero Club," by B. J. Hurren. The story of the Royal Aero Club of the United Kingdom, from its founding in 1901, through the two world wars, to its post-war resurgence. The book is a tribute to those men and women who have kept Britain foremost in the air. 30s. net from all booksellers. 31s. 2d. by post from Iliffe & Sons, Ltd., Dorset House, Stamford St., London, S.E.1.

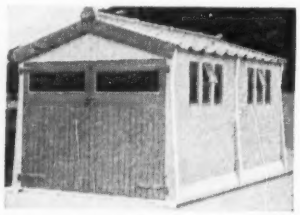
BOOKS, ETC.

"RALLIES and Trials," by S. C. H. Davis of "The Autocar." Describes in a colourful style the author's many adventures whilst driving in rallies and trials in all parts of Britain and Europe. The Monte Carlo Rally, the exciting Alpine Trials and many other spectacular events are recalled by this world renowned racing driver. 15s. net from all booksellers. 15s. 7d. by post from Iliffe & Sons, Ltd., Dorset House, Stamford St., London, S.E.1.

BOOKS, ETC.

"ROADS of France: A Guide to Tourist Routes," by A. G. Douglas Clease. A handy-size book which enables the France-bound motorist to find his way to the more popular tourist areas without worry or trouble. It also gives helpful information about hotels, charges and tips and other valuable hints for the first-time visitor. 5s. net from all booksellers. By post 5s. 2d. from Iliffe & Sons, Ltd., Dorset House, Stamford St., London, S.E.1.

THE MARLEY CONCRETE GARAGE



- Easy owner erection
- Permanent yet portable
- No maintenance costs
- Fireproof

Available in widths of 7' 10", 9'2" and 11'10" and in lengths as required from **£50 COMPLETE**

(Delivery free within a radius of 75 miles of Guildford, Romford or Cheltenham.) Write for Illustrated Brochure.

SURREY CONCRETE LTD · PEASMARSH · GUILDFORD
Telephone: Guildford 62986/7

Suppliers of machined and fabricated components in all Plastic and Allied materials to Britain's aircraft industry

Telephone: CLERKENWELL 2333/4 & 7247 — UHLHORN BROS. LIMITED — Telegrams: UHLHORN, AVE, LONDON

ESTD. 1887

We are proud to have the pleasure of supplying our precision products to many of the leading British aircraft constructors

UHLHORN BROS. LTD.
53 CITY ROAD, LONDON, E.C.1

INDEX TO ADVERTISERS

	Page
Aerocontacts, Ltd.	46
Airwork, Ltd.	26
Alvis, Ltd.	16
Armstrong Siddeley Motors, Ltd.	19
Ashdowns, Ltd.	28
Avica Equipment, Ltd.	43
Blackburn and General Aircraft, Ltd.	11
Bowden (Engineers), Ltd.	44
Bristol Aeroplane Co., Ltd., The	Cover iv
British Emulsifiers, Ltd.	28
British Thomson-Houston Co., Ltd., The	41
Brown Brothers (Aircraft), Ltd.	6
Cellon, Ltd.	18
Central Office of Information (Royal Navy)	10
Cross Manufacturing (1938), Ltd.	45
Decca Radar, Ltd.	5
De Havilland Aircraft Co., Ltd., The	24
Dowty Equipment, Ltd.	22, 45
Dunlop Rubber Co., Ltd.	35
Electrical Engineering Construction Co., Ltd.	40
English Electric Co., Ltd., The	34
Equator Wheels and Sections, Ltd.	42
Fairey Aviation Co., Ltd., The	23
Feltham and Son, Ltd., Walter H.	45
Fiat	4
Firth-Vickers Stainless Steels, Ltd.	13
Folland Aircraft, Ltd.	3
General Electric Co., Ltd., The	38
Gloster Aircraft Co., Ltd.	25
Godfrey and Partners, Ltd., Sir George	1
Handley Page, Ltd.	17
Henlys, Ltd.	47
Hobson, Ltd., H.M.	7
Iliffe and Sons, Ltd.	36
I.V. Pressure Controllers, Ltd.	44
Jessop and Sons, Ltd., William	30
Kenton Equipment, Ltd.	44
Lewis, Ltd., D.	45
Leytonstone Jig and Tool Co., Ltd., The	42
Lucas (Gas Turbine Equipment), Ltd., Joseph	29
Marconi's Wireless Telegraph Co., Ltd.	21
Mollart Engineering Co., Ltd.	39
Muir and Adie, Ltd.	45
Newton Bros. (Derby), Ltd.	38
Oldham and Son, Ltd.	41
Palmer Tyre, Ltd., The	Cover ii
Park, Ltd., R. and J.	36
Rellu nit (London), Ltd.	2
R.F.D. Co., Ltd.	31
Riley, Ltd., Robert	38
Robinson and Co. (Gillingham), Ltd., I.	40
Rotol, Ltd.	Cover i
Rumbold and Co., Ltd., L. A.	42
Sangamo Weston, Ltd.	34
Shell-Mex and B.P., Ltd.	33
Short Bros. and Harland, Ltd.	9, 47, 48
Sociétés Nationales de Constructions Aéronautiques Sud-est and Sud-ouest	15
Staravia	49
Sugg and Co., Ltd., William	44
Surrey Concrete, Ltd.	50
Teddington Controls, Ltd.	8
Thermionic Products, Ltd.	12
T.I. Aluminium, Ltd.	Cover iii
Tungum Co., Ltd., The	37
Uhlhorn Brothers, Ltd.	50
Ultra Electric, Ltd.	36, 43
Vickers-Armstrongs, Ltd.	20
Vinten, Ltd., W.	37
Vulcan Products, Ltd.	40
Westland Aircraft, Ltd.	14
Wiggin and Co., Ltd., Henry	27
Williamson Manufacturing Co., Ltd.	8
Wolverhampton Aviation, Ltd.	45
Wynn and Co. E. D.	50
Zwicky, Ltd.	39

Printed in Great Britain for the Publishers, ILIFFE & SONS LTD., Dorset House, Stamford Street, London, S.E.1, by SUN PRINTERS LTD., London, and Watford, Herts. *Flight* can be obtained abroad from the following: AUSTRALIA AND NEW ZEALAND: Gordon & Gotch, Ltd. INDIA: A. H. Wheeler & Co. CANADA: The Wm. Dawson Subscription Service, Ltd.; Gordon & Gotch, Ltd. SOUTH AFRICA: Central News Agency, Ltd.; Wm. Dawson & Sons (S.A.), Ltd. UNITED STATES: The International News Co. Entered as Second Class Matter at the New York, U.S.A., Post Office.

TI and the Comet

T.I. Aluminium have been privileged to supply Aluminium Alloy Tubing, Bar and Extrusions for the De Havilland Comet Jet Air Liner. In particular, we pride ourselves on the successful production of the Wing Stringer Sections. These were required in DTD 363 with a maximum thickness on the flanges of .05" and .07" thick on the channel portion. Weight control was particularly important, and a further requirement was that both flanges should be dead flat and parallel to each other. The successful solution of the production problems involved is another instance of teamwork behind the scenes which enables T.I. Aluminium to maintain a high standard of service to the Aircraft Industry.

PUT Aluminium FIRST
AND TI IN FRONT OF IT

T.I. ALUMINIUM LTD

REDFERN ROAD, TYSELEY, BIRMINGHAM. TEL: ACOCKS GREEN 3333

ALUMINIUM AND ALUMINIUM ALLOY INGOT, SLABS, BILLETS, SHEET, STRIP, TUBES AND EXTRUSIONS TO ALL COMMERCIAL, A.I.D. AND LLOYD'S SPECIFICATIONS.

A TI COMPANY

"Bristol" AT XIX^{ème} SALON
D'AERONAUTIQUE - LE BOURGET

26th June - 5th July

BRITANNIA · FREIGHTER
TYPES 171 & 173 HELICOPTERS
OLYMPUS · PROTEUS
HERCULES · CENTAURUS

THIS PUBLICATION IS REPRODUCED BY AGREEMENT WITH THE COPYRIGHT OWNER. EXTENSIVE DUPLICATION OR RESALE WITHOUT PERMISSION IS PROHIBITED.